RECORD OF DECISION

Operable Unit 2 of the General Motors – Inland Fisher Guide
Subsite of the Onondaga Lake Superfund Site
Town of Salina, Onondaga County, New York

New York State Department of Environmental Conservation
and
United States Environmental Protection Agency
Region II
March 2015

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Operable Unit 2 of the General Motors – Inland Fisher Guide
Subsite of the Onondaga Lake Superfund Site
Town of Salina, Onondaga County, New York

Superfund Site Identification Number: NYD986913580
Operable Unit: 09 (Operable Unit 2 of this Subsite)

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Unit (OU) 2 of the General Motors Inland Fisher Guide Subsite (Subsite) of the Onondaga Lake Superfund Site (Site), chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 (NCP). This decision document explains the factual and legal basis for selecting a remedy to address the contaminated soils and sediments associated with the Subsite. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

NYSDEC is the lead agency for this Subsite. The EPA has determined that the selected remedy meets the requirements for a remedial action as set forth in CERCLA Section 121, 42 USC § 9621. As such, for the purpose of satisfying this remedy selection criterion of the NCP, NYSDEC, on behalf of New York State, supports the selected remedy. NYSDOH also supports the selection of this remedy; its letter of concurrence is attached (see Appendix IV).

ASSESSMENT OF THE SUBSITE

The response action selected in this Record of Decision is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances, pollutants or contaminants from this Subsite.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy, which addresses contaminated soil and sediment, includes the following components:

- Mechanical excavation of an estimated 9,600 cubic yards (CY) of sediments in Ley Creek exceeding 1 milligram per kilogram (mg/kg) of Polychlorinated Biphenyls (PCBs). It is assumed that the excavation will be from bank-to-bank and the depths of excavation will be to the unconsolidated bed material, to the extent practicable. Figure 8 depicts the areas of the Creek where sediment will be excavated. The areal footprint of areas to be excavated will be refined during the remedial design.
- Excavation of an estimated 15,000 CY of surface and subsurface floodplain soil to meet the restricted Soil Cleanup Objectives (SCOs) (see Table 7) consistent with current and reasonably anticipated future land use of discrete Subsite areas as follows:[1]
    - continued industrial use for the neighboring National Grid property (except for ecological use within and adjacent to the wetland);
    - ecological use for areas in the Ley Creek floodplain, except for areas of residential use where the residential use SCO is lower than the ecological use SCO (*i.e.*, chromium); and
    - commercial use of the property along Factory Avenue.
- Transport of the excavated Creek and wetland sediments to a staging area where they will be dewatered. It is assumed that this water will require treatment prior to discharge.
- Transport of the excavated contaminated soils and sediments containing greater than 50 mg/kg of PCBs to a Toxic Substances Control Act (TSCA)-compliant facility.
- Transport of those soils and sediments which fail Toxic Characteristic Leaching Procedure testing[2] and are determined to be characteristic hazardous waste and are non-TSCA waste (*i.e.,* less than 50 mg/kg PCBs) to an off-site RCRA-compliant facility.
- Transport of those soils and sediments that are non-TSCA-regulated (less than 50 mg/kg of PCBs) and are not characteristic hazardous waste to a RCRA-compliant facility.[3]

---

[1] Most soil excavations are anticipated to be 1 to 4 feet in depth; with some limited areas excavated to depths as deep as 6 feet within the Ley Creek floodplain hot spot. The locations and assumed excavations for soil removal are illustrated on Figures 4 through 7. Confirmatory sampling will be conducted to ensure the excavations are complete.

[2] TCLP testing is a soil sample extraction method for chemical analysis employed as an analytical method to simulate contaminant leaching. The testing methodology is used to determine if a waste is a characteristic hazardous waste under the Resource Conservation and Recovery Act (RCRA).

[3] The September 30, 2014 ROD for the Lower Ley Creek subsite called for either local or non-local disposal of the excavated soils and sediments with PCB concentrations less than 50 mg/kg. Should local disposal of the soils and sediments be employed at the Lower Ley Creek subsite, consideration will be given to similarly disposing of the excavated soil and sediment from the GM-IFG Subsite.

- Clean fill meeting the requirements of DER-10, Appendix 5 will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the Subsite. With the exception of the Factory Avenue Area and Factory Avenue/LeMoyne Avenue Intersection Area excavations, excavated areas will be restored with clean substrate and vegetation as per an approved habitat restoration plan developed as part of the design. Excavated areas along Factory Avenue will be restored with a cover which will consist of an indicator fabric layer, as needed, overlain by 12 inches of clean soil (minimum) and a top layer consisting of vegetation, asphalt, or gravel, as appropriate, for the area being restored.
- Appropriate controls and monitoring (*e.g*., community air monitoring) will be utilized to ensure that during remediation activities, airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.
- Habitat restoration of Ley Creek excavated areas which will consist of the placement of at least 0.5 feet of substrate similar to the existing sediments over disturbed areas and restoration of vegetation. The specific thickness and substrate material to be used for the backfill in these areas will be determined during the remedial design as part of a habitat restoration plan. The main goal of the habitat restoration will be to restore the habitats affected by the remedy, and the restoration will meet the substantive requirements of 6 NYCRR Part 608 and 663. A habitat assessment will be performed to support the restoration design. The habitat assessment will include an assessment of the Ley Creek removal areas for mussels and will determine any actions necessary (if any) to minimize impacts to existing populations. The habitat restoration plan will also describe the specific design for areas impacted by the remediation of sediments and soils and determine the appropriate plantings (including types and locations) necessary to restore habitats. The habitat restoration plan will also include the necessary requirements for monitoring restoration success and for needed restoration maintenance. Monitoring requirements will be determined during the design.
- Institutional controls in the form of environmental easements will be used to restrict intrusive activities in areas where contamination remains unless the activities are in accordance with an approved Site Management Plan (SMP).
- The SMP will provide for the proper management of all post-construction remedy components. Specifically, the SMP will describe procedures to confirm that the requisite engineering (*e.g.,* demarcation layer) and institutional controls are in place and that such controls continue to protect public health and the environment. The SMP will also detail the following: the provision for the management of future excavations in areas where contamination remains; an inventory of any use restrictions; the necessary provisions for the implementation of the requirements of any above-noted environmental easements and/or restrictive covenants; a provision for the performance of the operation and monitoring required for the remedy; and a provision that a property owner or party implementing the remedy submit periodic certifications that the institutional and engineering controls are in place.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with the EPA Region 2's Clean and Green Energy Policy and NYSDEC's DER-31 Green Remediation Policy.[4] Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1- Statutory Requirements

The selected remedy meets the requirements for remedial actions set forth in CERCLA in Section 121, 42 U.S.C. §9621, because as implemented : 1) it is protective of human health and the environment; 2) it meets a level of standard of control of the hazardous substances, pollutants, and contaminants which at least attains the legally applicable or relevant and appropriate requirements under the federal and State laws; 3) it is cost-effective; and 4) it utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Part 2- Statutory Preference for Treatment

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). For OU2, NYSDEC and the EPA do not believe that treatment of the sediments and soil is practicable or cost effective given the widespread nature of the sediment and soil contamination and the generally low concentrations of contaminants present in the sediment and soils that are being addressed.

Part 3- Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, statutory reviews will be conducted at least every five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for OU2.

---

[4] See http://epa.gov/region2/superfund/green_remediation and http://www.dec.ny.gov/docs/-remediation_hudson_pdf/der31.pdf

- Contaminants of concern and their respective concentrations in the “Summary of Subsite Characteristics” section (see Decision Summary, pages 6-13 and Appendix II, Table 1);

- Baseline risk represented by the contaminants of concern in the “Summary of Subsite Risks” section (see Decision Summary, pages 14-21);

- Cleanup levels established for contaminants of concern and the basis for these levels in the “Remedial Action Objectives” section (see Decision Summary pages 22-23, Appendix II, Table 7);

- Manner of addressing source materials constituting principal threats in the “Principal Threat Waste” section (See Decision Summary, page 38);

- Potential land use that will be available at the Subsite as a result of the selected remedy in the “Expected Outcomes of the Selected Remedy” section (see Decision Summary, pages 43-44);

- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected in the “Description of the Selected Remedy” subsection (see Decision Summary, pages 39-43 and Appendix II, Table 9.2); and

- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) in the “Summary of the Rationale for the Selected Remedy” subsection (see Decision Summary, page 39).

AUTHORIZING SIGNATURES

March 31, 2015

Robert W. Schick, P.E., Director
Division of Environmental Remediation
NYSDEC

Date

March 31, 2015

Walter E. Mugdan, Director
Emergency and Remedial Response Division
EPA, Region 2

Date

DECISION SUMMARY

Operable Unit 2 of the General Motors – Inland Fisher Guide
Subsite of the Onondaga Lake Superfund Site
Town of Salina, Onondaga County, New York

New York State Department of Environmental Conservation
and
United States Environmental Protection Agency
Region II
March 2015

TABLE OF CONTENTS

SUBSITE NAME, LOCATION, AND DESCRIPTION

The General Motors – Inland Fisher Guide (GM-IFG) Subsite (Subsite) of the Onondaga Lake Superfund Site[1] (Site) is located in the Town of Salina, Onondaga County, New York. The Subsite consists of the former plant, located south of Ley Creek on Townline Road in the Town of Salina and approximately 9,200 linear feet Ley Creek including the adjacent floodplains between Townline Road and the Route 11 Bridge (a.k.a. Brewerton Road). The Subsite does not include the Ley Creek PCB Dredgings subsite described in the "Site History and Enforcement Activities" section, below. Also included in the Subsite is a 10-acre wetland (referred to as the "National Grid Wetland") located on the northern portion of the National Grid property directly west of the former GM-IFG facility, soil in the approximately 1.8-acre area located directly between the former GM-IFG facility's northern property boundary and Factory Avenue (referred to as the "Factory Avenue Area") and soil in the area located along the northern shoulder of Factory Avenue in the vicinity of LeMoyne Avenue (referred to as the "Factory Avenue/LeMoyne Avenue Intersection Area").

Ley Creek, which drains an area of approximately 30 square miles, flows due west approximately two and a half miles downstream from the facility, where it discharges into Onondaga Lake. The Ley Creek drainage basin can, generally, be described as a highly urbanized area. Portions of the city of Syracuse and the towns of Cicero, Clay, DeWitt, Manlius and Salina are located in the Ley Creek drainage basin. Also located in the Ley Creek watershed are interstate highways, a National Grid electrical transfer station, Syracuse International Airport and the Air National Guard's Hancock Field. Large areas of impermeable surfaces in the Ley Creek watershed cause rapid runoff during storms and corresponding rapid rising of flow and water levels.

The National Grid Wetland is part of the New York State-regulated wetland known as "SYE-6." A drainage ditch is located along the northern edge of the National Grid property along Factory Avenue. Upland drainage flows into this wetland from the south and is discharged north to the ditch and through culverts under Factory Avenue towards Ley Creek. Wetland vegetation, trees and shrubs comprise the dominant vegetation of the wetland. The National Grid property is currently zoned for industrial use.

The Factory Avenue Area extends from the northwestern corner of the facility property to Townline Road. The Factory Avenue Area is characterized by maintained grass and is a corridor for overhead and underground utilities. Specifically, a natural gas pipeline and an Onondaga County sanitary sewer are present underground along this corridor. The Ley Creek PCB Dredgings subsite is located across Factory Avenue to the north of this area. This area is currently zoned for industrial use.

---

[1] The Onondaga Lake Superfund site's Superfund site Identification Number is NYD986913580. NYSDEC is the lead agency for the Subsite; the EPA is the support agency.

The Factory Avenue/LeMoyne Avenue Intersection Area is located north of Factory Avenue in the vicinity of LeMoyne Avenue down to the Route 11 Bridge. This area is currently zoned for commercial use.

SUBSITE HISTORY AND ENFORCEMENT ACTIVITIES

Industrialization of the area began soon after the completion of the Erie Canal in 1857 and the development of railroads in eastern Syracuse. Several industries have been located near Ley Creek and its branches since the late 19th and early 20th centuries. The industrial nature of this area, as well as the infrastructure and other development, influenced this site and contributed to its current condition.

Assessments have been performed at many areas in the Onondaga Lake drainage basin to determine what sources have contributed to the contamination of Onondaga Lake. The Lake has a footprint of approximately four and a half square miles and a drainage basin of approximately 250 square miles. On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste Disposal sites. The Onondaga Lake Superfund site, which includes the Lake itself, six major and minor tributaries and various upland sources of contamination, was placed on the EPA's National Priorities List (NPL) on December 16, 1994. This NPL listing means that the lake system is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there has been a release of hazardous substances, pollutants, or contaminants. New York State Department of Environmental Conservation (NYSDEC) and the EPA have, to date, organized the work for the Onondaga Lake NPL site into discrete subsites. These subsites are also considered by the EPA to be operable units (OUs) of the NPL site. The GM-IFG site is a subsite.

The Subsite consists of two OUs--OU1, which addresses the former plant and groundwater on, and emanating from, the former plant, and OU2 (which is the subject of this ROD), which includes "other media" not addressed under OU1. Specifically, OU2 includes Ley Creek channel sediments, surface water and floodplain soils/sediments in the reach from Townline Road to the Route 11 Bridge, and the National Grid Wetland, Factory Avenue Area and Factory Avenue/LeMoyne Avenue Intersection Area described above.

In 1938, the area in the vicinity of Ley Creek was primarily farmland. Since then, commercial and industrial development has occurred in the drainage basin, including in areas bordering the Creek.

GM began operations in the Town of Salina in 1952. Operations conducted at the GM-IFG facility included metal die casting; nickel, chromium and copper cyanide electroplating; stamping; polishing; buffing; painting and machining. During the early 1960s, injection molding operations were added to the existing metal operations. Metal finishing and die casting were subsequently reduced and replaced by injection molding by the early 1970s. PCB-containing hydraulic oil was used in die cast machines and injection molding operations until 1968 and in the diffusion pumps of three vacuum metallizers until 1969. More than 120 injection molding machines operated at the plant until plant operations ceased in December 1993. PCB-containing oil leaked from the machines to floor drains and sumps. During early facility operations, this oil and other process waste was discharged to an on-site swale. The swale discharged to Ley Creek, where PCBs are found in the sediments down to the mouth of the Creek at Onondaga Lake.

Prior to the early 1970s, poor channel conditions and large impermeable areas in the watershed caused extensive flooding of Ley Creek. These flooding events led to the creation of the Ley Creek Drainage District. Beginning in 1970, the Onondaga County Department of Drainage and Sanitation widened, deepened and rerouted the Creek through the Town of Salina Landfill. Dredged materials were spread along the banks of Ley Creek in addition to being disposed of at the Town of Salina Landfill. Areas along the south bank of Ley Creek, upstream of the Route 11 Bridge, where PCB-contaminated dredge spoils were placed, were included on the New York State Registry of Inactive Hazardous Waste sites as the Ley Creek PCB Dredgings subsite. A ROD was issued by NYSDEC for the Ley Creek PCB Dredgings subsite in March 1997, which called for the excavation and disposal of PCB-contaminated material greater than 50 milligrams per kilogram (mg/kg) and the consolidation and on-Site capping of material less than 50 mg/kg in compliance with the Toxic Substances Control Act (TSCA) PCB cleanup and disposal regulations (40 CFR Part 761). The remedy was completed in 2001, and the Ley Creek PCB Dredgings subsite is currently monitored and maintained.

NYSDEC and GM entered into an Administrative Order on Consent (Index # D-7-0001-97-06) (Order), which became effective on September 25, 1997. The Order required GM to conduct an (RI/FS)[2] for the Subsite. Soil, sediment, surface water and biota samples were obtained for chemical analysis as part of the RI. Three significant Interim Remedial Measures (IRMs)[3] were implemented at the Subsite from 2002 to 2004 to prevent further migration of PCBs from the facility to Ley Creek:

---

[2] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks and an FS identifies and evaluates remedial alternatives to address the contamination.

[3] The use of the term "Interim Remedial Measure" throughout this document is not intended to mean that this removal action is a "remedial action" as that term is defined in the federal law, CERCLA. An IRM is an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term need to be undertaken to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is equivalent to a non-time critical removal under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal program pursuant to 40 CFR Section 300.415(b)(2).

- Former Landfill IRM: An industrial landfill at the former GM-IFG facility that contains chromium- and PCB-contaminated material was capped to prevent contaminants from leaching into the groundwater. In addition, hot spots associated with the landfill were excavated.
- Former Drainage Swale IRM: This second action involved the removal of highly-contaminated soil from a former discharge swale. This swale was used in the 1950s and 1960s as a conduit for the discharge of liquid process waste to Ley Creek. The swale was subsequently filled in, but the contaminated soil remained until the performance of this action. Over 26,000 tons of soils containing PCBs were removed from this area of the GM-IFG property.
- SPDES Treatment System IRM: The third action involved the construction of a retention pond and associated water treatment system. This pond collects all water that accumulates on the GM-IFG property in any of the storm sewers or abandoned process sewers. The pond water is then sent through the treatment plant in order to meet permitted discharge limits, prior to discharge to Ley Creek. The purpose of this response action was to stop the intermittent discharge of PCBs and other contaminants that occur during storm events.

In 2005, GM conducted a Phase 1A Cultural Resources Survey for OU1 and OU2. The Cultural Resources Survey Report[4] concluded that no further cultural resources investigation was required. This document was approved by NYSDEC in December 2005.

In 2009, GM filed for bankruptcy, and on March 31, 2011, administration of the remedial activities at the Subsite was taken over by the Revitalizing Auto Communities Environmental Response (RACER) Trust, the current property owner. The RACER Trust completed the RI/FS for OU2. The RI report (March 2013) was approved by NYSDEC in April 2013. The FS report (May 2013) and an FS report addendum (June 2014) will be approved by NYSDEC concurrent with the issuance of this ROD.

An RI/FS is currently underway for OU1. The OU1 RI/FS is investigating the facility property and groundwater. A Proposed Plan for OU1 will be released to the public following the completion of the FS.

In addition the Lower Ley Creek subsite, which is located downstream of OU2, consists of the contaminated sediments and floodplain soils along the lower two miles of Ley Creek, beginning at, and including, the Route 11 Bridge and ending downstream at the mouth of Ley Creek and its confluence with Onondaga Lake, as well as the sediments

[4] Phase 1A Literature Review and Archeological Sensitivity Assessment, Former IFG Facility and Ley Creek Deferred Media, Towns of Salina and Dewitt, Onondaga County, New York, June 2005.

and floodplain soils associated with the “Old Ley Creek Channel” (the pre-1970s dredging route of the Creek). A ROD for the Lower Ley Creek subsite was issued on September 30, 2014. The selected remedy calls for the excavation and disposal of PCB-contaminated creek sediments, wetland sediments and floodplain soils located in areas adjacent to the creek.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI and FS reports and a Proposed Plan supporting the OU2 remedy were released to the public for comment on November 17, 2014. These documents were made available to the public at information repositories maintained at the Salina Library, Atlantic States Legal Foundation, NYSDEC Region 7 office located in Syracuse, New York and the NYSDEC Division of Environmental Remediation office located in Albany, New York. An NYSDEC listserv bulletin notifying the public of the availability for the above-referenced documents, the comment period start and completion dates and the date of the planned public meeting was issued on November 17, 2014. The public comment period ran from November 17, 2014, to December 17, 2014.

A second public comment period ran from January 14, 2015 to February 14, 2015. An NYSDEC listserv bulletin notifying the public of the availability for the RI and FS reports and Proposed Plan and the second comment period’s completion date was issued. This information was also published in *The Post-Standard* on January 14, 2015.

On December 2, 2014, NYSDEC conducted a public meeting at the Town of Salina Town Hall to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for OU2 of the Subsite, including the preferred remedy, to respond to questions, and to accept comments. There were approximately 20 attendees. Responses to the questions and comments received at the public meeting and to comments submitted in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

The Onondaga Nation reviewed the draft RI and FS reports and draft Proposed Plan, and NYSDEC communicated with representatives of the Onondaga Nation about these documents. NYSDEC intends to continue consultation discussions with the Onondaga Nation throughout the design and construction phases of the implementation of the remedy.

SCOPE AND ROLE OF THE OPERABLE UNIT

Because many Superfund sites are complex and have multiple contamination problems and/or areas, they are often divided into several OUs for the purpose of managing the site-wide response actions. The NCP (at Section 300.5) defines an OU as “a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of OUs, depending on the complexity of the problems associated with the site. OUs may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

NYSDEC and the EPA have, to date, organized the work for the Onondaga Lake NPL Site into 11 subsites (see Figure 2). These subsites are also considered by the EPA to be OUs of the NPL Site.[5] Four of the subsites (GM-IFG, Ley Creek PCB Dredgings, Salina Landfill, and Lower Ley Creek) are on and/or abut Ley Creek. The Subsite and Ley Creek PCB Dredgings subsite include and/or are adjacent to the reach of Ley Creek from Townline Road to the Route 11 Bridge. The Salina Landfill and Lower Ley Creek subsites include and/or are adjacent to the reach of Ley Creek from the Route 11 Bridge to Onondaga Lake. As was noted in the "Site History and Enforcement Activities" section, above, the Subsite consists of two OUs. OU1 addresses the former plant and groundwater on, and emanating from, the former plant and OU2 includes Ley Creek channel sediments, surface water and floodplain soils/sediments in the reach from Townline Road to the Route 11 Bridge, and the National Grid Wetland, Factory Avenue Area and Factory Avenue/LeMoyne Avenue Intersection Area (also referred to as "Ley Creek Deferred Media"). This response action documented in this ROD addresses OU2. An RI/FS for OU1 is currently underway.

As discussed elsewhere in this Decision Summary, Ley Creek is an urban watershed that receives runoff from a large urban area and low levels of sediment contaminants that are attributable to urban background can be found in samples upstream of the Subsite.

SUMMARY OF SUBSITE CHARACTERISTICS

The RI activities that were conducted under OU2 included geological and hydrogeological investigations, an ecological assessment, wetlands delineation and the collection of samples from the soil, surface water, sediment and biota.

Several metals detected on the GM-IFG facility are identified as "Site-related metals" (*i.e.*, arsenic, chromium, copper, lead, nickel and zinc) when found in GM-IFG OU2 media. Other metals, (*e.g.*, mercury/methylmercury) were found within the watershed and evaluated in the RI/FS, but are not associated with the Subsite and are considered to be "non-site-related" metals.

---

[5] The terms "subsite" and "OU" are used interchangeably in this document and are meant to be defined as one and the same.

Based upon the results of the RI, NYSDEC and the EPA have concluded that the primary contaminants of concern (COCs) for this Subsite are PCBs, PAHs,[6] chromium, copper, lead, nickel and zinc, with PCBs being the predominant contaminant in the Subsite soils and creek sediments. A review of the sampling results indicates that the PCBs are collocated with the vast majority of other COCs. Soil, sediment, surface water and biota investigations for OU2 are described below.

Subsite Geology and Hydrogeology

Ley Creek Hydrology

Onondaga Lake receives surface runoff from a drainage basin of approximately 250 square miles. Surface water flows into the Lake via six tributaries: Ninemile Creek; Onondaga Creek; Harbor Brook; Bloody Brook; Sawmill Creek and Ley Creek. Ley Creek accounts for approximately eight percent of the total water inflow to the Lake.

Ley Creek flows west to ultimately discharge into Onondaga Lake, approximately 2.5 miles downstream of the GM-IFG facility. Ley Creek was restructured and dredged to aid in storm water drainage in the 1970s. The reach of Ley Creek from Townline Road to the Route 11 Bridge was most recently dredged in 1983. Water depths range from less than three inches to approximately four feet, depending on channel width, flow rates and bottom profile. Flow rates also vary significantly ranging from less than 1 cubic foot per second (cfs) to 1,400 cfs. Ley Creek varies in width from less than 10 feet to more than 30 feet.

The substrate is predominantly gravel and fine inorganic material with little to no submerged or emergent aquatic vegetation. Sediment probing performed during the RI indicated that the main channel of Ley Creek is primarily hard substrate with limited sediment depositional areas. Depositional areas are generally limited to the edges of the channel.

The portion of Ley Creek associated with OU2 is classified as a 6 NYCRR § 701.7 New York State Class B stream. The best usages of Class B fresh surface waters are "primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival." The Creek is not used as a public water supply, although it is accessible for fishing or other recreation. The fish species found during recent investigations include bluegill, pumpkinseed, shiners, bullhead, and carp. There is no commercial transportation use of the Creek. Efforts since 1970 to alleviate the flooding of Ley Creek have been generally successful, though flooding still occurs in portions of the Creek.

[6] It should be noted that all or some of the PAHs are likely from anthropogenic sources such as urban runoff.

Subsite Hydrogeology

The bedrock geology in the area of Ley Creek generally consists of sedimentary rock units from the Paleozoic-age Salina Group which, in order of oldest to youngest, consists of the Vernon Formation, the Syracuse Formation, Camillus Shale and the Bertie Formation. Specifically, the bedrock underlying the Subsite is made up of units of the Vernon Formation, which consists of upper Silurian shale and dolostone. Groundwater discharge to surface water channels accounts for most of the stream flow in the Onondaga Lake Basin. Groundwater discharge accounts for an estimated 56 percent of stream flow in Ley Creek. The groundwater can be found from eight to 12 feet below ground surface (bgs) in the overburden of the Subsite.

Soil

Soil investigations were performed between 1986 and 2009 and are documented in the RI report.[7]

6 NYCRR Part 375 (NYSDEC Division of Environmental Remediation Environmental Remediation Programs, effective December 14, 2006) unrestricted use soil cleanup objectives (SCOs) were used as RI screening values for comparison purposes. Part 375 SCOs for the protection of ecological receptors (Ley Creek Floodplain Area and National Grid Wetland) and Part 375 industrial use SCOs (Factory Avenue Area and portions of the National Grid property) were also used during the screening process to provide a context for the contaminant concentrations detected.

The following sections summarize the soil contamination as characterized in the discrete OU2 areas.

Ley Creek Floodplain Area

Soil in the Ley Creek Floodplain Area (see Figure 2) was investigated through samples collected within the Ley Creek 100-year floodplain between Townline Road and Route 11 (excluding the Ley Creek PCB Dredgings subsite) as part of a series of sampling events conducted by GM between 2003 and 2007, and in connection with an intersection improvement at Lemoyne Avenue and Factory Avenue on behalf of Onondaga County in 2009. The initial samples collected in the Ley Creek Floodplain Area in 2003 indicated the presence of PCBs at concentrations above the Part 375 unrestricted SCO of 0.1 mg/kg, which was used as a screening value during the RI. Sample results ranged from not detected to 35 mg/kg, though most of these detections were below 1 mg/kg PCBs. An additional round of sampling followed in 2004, which identified a localized

[7] Revised Final Off-Site Remedial Investigation, Former IFG Facility and Deferred Media Site, Syracuse, New York, March 2013.

floodplain hot spot. The results of this sampling documented the presence of PCB concentrations ranging from not detected to 130 mg/kg. Soil samples in the vicinity of the 130 mg/kg detection also exhibited visual staining. Subsequent sampling conducted in 2005 and 2007 focused on the area of visual staining. Samples collected between 2003 and 2007 in the vicinity of the stained area exhibited concentrations ranging from 0.11 mg/kg to 61 mg/kg PCBs along an approximately 180-foot long stretch on the northern bank of Ley Creek, down to a depth of 6 feet. Westernmost and northernmost samples exhibited concentrations below 1 mg/kg PCBs, the Part 375 SCO for the protection of ecological resources. The easternmost sample exhibited a concentration of 6.4 mg/kg at the deepest interval sampled (4 to 6 feet below ground surface bgs]).

In connection with rehabilitation work for the Route 11 Bridge, two soil samples were collected by the New York State Department of Transportation from one location on the bank of Ley Creek in November 1992 in the Subsite area. The samples, located east of the northern bridge abutment (upstream), were collected from 0 to 8 inches and 8 to 16 inches below grade. PCBs were detected in each sample at concentrations above the Part 375 unrestricted use SCO of 0.1 mg/kg ranging from 4 mg/kg (8 to 16 inches) to 55 mg/kg (0 to 8 inches). VOCs and SVOCs were not detected in either sample. Detected metals concentrations were within typical ranges for natural soils.

National Grid Wetland Area

Investigation of the National Grid Wetland Area (see Figure 2) has been conducted over various sampling events associated with evaluating conditions within the wetland and the drainage ditch (approximately 760 long by 20 feet wide) that runs north of the wetland along Factory Avenue on this property and in connection with the soil removal IRMs described above.

PCBs were detected in the Factory Avenue drainage ditch soils at concentrations greater than the Part 375 unrestricted SCO, ranging from 0.22 mg/kg to 370 mg/kg, and extending approximately 760 feet along the ditch westward from the former GM-IFG facility property. These concentrations were encountered as deep as 3.5 feet. While the westernmost sample exhibited a concentration of 0.27 mg/kg PCBs, still slightly above the Part 375 unrestricted SCO of 0.1 mg/kg PCBs, concentrations at this location were significantly lower than other samples collected within the wetland area. The extent of Subsite-related metals detected at concentrations above the corresponding Part 375 unrestricted SCOs follows a similar pattern, with exceedances noted in the ditch, though the westernmost sample in the ditch exhibits concentrations below the corresponding Part 375 unrestricted SCOs for Subsite-related metals (arsenic, total chromium, copper, lead, nickel and zinc). In addition, there are relatively limited areas within the

National Grid Wetland Area where Subsite-related metals were detected at concentrations above the corresponding Part 375 ecological SCOs. Samples collected in the National Grid Wetland Area in connection with investigations for National Grid (then Niagara Mohawk) were analyzed for SVOCs and VOCs. Detectable concentrations of SVOCs and VOCs were below the corresponding 6 NYCRR Part 375 SCOs for unrestricted use. PCB concentrations greater than the Part 375 SCO for the protection of ecological resources extended west, approximately 660 feet along the ditch.

The wetland located on the northern portion of the National Grid property was sampled between 2001 and 2008 during a series of efforts to evaluate the extent of contamination within the wetland. Results of these investigations showed PCB Aroclors 1242, 1248, and 1260 in wetland soil at concentrations greater than the Part 375 unrestricted SCO, ranging from 0.11 mg/kg to 14,000 mg/kg PCBs. These detections were encountered as deep as 2.75 feet. Contamination in the western half of the wetland extends approximately 140 feet to the south, and in the eastern half of the wetland extends approximately 230 feet to the south, where detectable concentrations of PCBs and Subsite-related metals were below the corresponding Part 375 unrestricted SCOs.

As part of the Former Landfill IRM hot spot excavation, confirmatory samples were obtained from the National Grid Wetland Area. Analytical results indicated concentrations greater than the Part 375 unrestricted SCO in four samples ranging from 0.1 mg/kg to 42 mg/kg.

Factory Avenue Area

The majority of the soil samples collected in the Factory Avenue Area (see Figure 2) are associated with efforts to bound the northern extent of the excavations from the Former Landfill IRM and the Former Drainage Swale IRM in the vicinity of a National Grid gas line that runs parallel to the northern property boundary and Factory Avenue. Samples collected in the immediate vicinity of the National Grid gas line, exhibiting concentrations greater than the Part 375 unrestricted use SCO, ranged from 0.13 mg/kg to 18,000 mg/kg PCBs. The higher concentrations are associated with the edge of hot spots and the former drainage swale, located approximately 8 to 10 feet bgs (0.13 mg/kg to 18,000 mg/kg PCBs), and surface soils in the vicinity of the new access road to the Former Landfill (1.4 mg/kg to 54 mg/kg PCBs). In addition, samples east of this area exhibited relatively low concentrations of PCBs but greater than the Part 375 unrestricted use SCO ranging from 0.16 mg/kg to 1.25 mg/kg.

Samples collected along the shoulder of Factory Avenue in connection with roadway improvements at the Factory Avenue and LeMoyne Avenue intersection indicated the presence of PCBs (not detected to 8.8 mg/kg) and Subsite-related metals (2.1 mg/kg to 13.6 mg/kg arsenic; 5.17 mg/kg to 265 mg/kg chromium; 9.5 mg/kg to 219 mg/kg copper; 2.3 mg/kg to 398 mg/kg lead; 9.41 mg/kg to 97.9 mg/kg nickel; and 17.9 to 429 mg/kg zinc) at concentrations above corresponding Part 375 unrestricted SCOs, but generally below the commercial SCOs.

Sediment

GM-IFG sediment sample locations are depicted on Figure 2. To evaluate upstream conditions, samples were collected from Ley Creek upstream of Townline Road and from three upstream branches of Ley Creek: North Branch Ley Creek, South Branch Ley Creek and Sanders Creek. Samples collected from Ley Creek between Townline Road and Route 11 (on-site) as well as samples collected upstream of the Subsite exhibited concentrations of PCBs and Subsite-related metals (arsenic, chromium, copper, lead, nickel, zinc) above the NYSDEC sediment criteria (NYSDEC Technical Guidance for Screening Contaminated Sediments, January 1999) at the concentrations denoted in Table 1. Due to the limited deposition of sediment in the upstream and Subsite portions of the Creek, samples were only obtained to depths of two feet.

For comparison purposes, Table 2 provides sediment criteria for the Subsite's metals from the NYSDEC Technical Guidance for Screening Contaminated Sediments (January 1999). It should be noted that PCBs are the primary risk driver for all pathways for this Subsite (see the "Summary of Subsite Risks" section, below).

Surface Water

Surface water samples were collected during four sampling events between 1996 and 2002 in Ley Creek and in the drainage ditch that runs along the south side of Factory Avenue.

Applicable screening values from the NYSDEC's Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1., Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June 1998) were used to evaluate surface water detections.

Analytical results indicate that chlorinated VOCs, PCBs, and metals were detected in the surface water samples. With the exception of PCBs, concentrations were below applicable surface water standards.[8] PCB Aroclor 1248 was detected above the

[8] Technical and Operational Guidance Series Number 1.1.1. New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, 1998b); National Recommended Ambient Water Quality Criteria (EPA, 2009a); EPA Region 3 Biological Technical Assistance Group Freshwater Screening Benchmarks (EPA, 2006A); and ECO Update: Ecotox Thresholds (EPA, 1996)

standards of 0.00012 micrograms per liter (µg/L) (wildlife protection) and 0.000001 µg/L (protection of human consumers of fish) in one sample collected between Townline Road and Route 11 at 0.04 µg/L, and in one sample collected from the drainage ditch along Factory Avenue at 0.51 µg/L. PCBs were not detected in upstream surface water samples (detection limits range from 0.5 to 1 µg/L). It should be noted that typical detection limits for PCBs in water are greater than the surface water standards discussed above (see Figure 2).

Biota

Fish and crayfish tissue were collected as an additional line of evidence to assess risk to the fish and benthic community, respectively, and as measured inputs to the piscivorous food chain models. Biota data are described with respect to samples collected in Ley Creek upstream of Townline Road (including three upstream branches of Ley Creek, North Branch Ley Creek, South Branch Ley Creek and Sanders Creek) and from the Subsite (*i.e*., from Townline Road to Route 11).

SVOCs, PCBs and certain Subsite-related metals (chromium, copper and zinc) were detected in biota samples (fish and macro-invertebrates) collected from the Subsite and in samples collected upstream of the Subsite. Average and maximum detected concentrations for copper in upstream fish tissue samples were higher than in samples collected from the Subsite. Average concentrations of zinc and the maximum concentration of bis(2-ethylhexyl)phthalate were also found to be higher upstream of the Subsite. Average concentrations of non-Subsite-related metals manganese and mercury/methylmercury were also found at higher concentrations in samples collected upstream of the Subsite. In addition, maximum concentrations of mercury and methylmercury were higher upstream than within the Subsite reach.

The average total PCB fish tissue concentration in samples from the Subsite reach were higher than from samples collected upstream of the Subsite (1.91 mg/kg versus 1.14 mg/kg). In fish tissue, the average and maximum detected concentrations for three out of seven inorganic constituents (copper, mercury, methyl mercury) were higher upstream than in the Subsite reach. Average concentrations of manganese and zinc and the maximum concentration of bis(2-ethylhexyl)phthalate were also identified as higher upstream.

Both the average and maximum invertebrate tissue constituent concentrations for three Subsite-related metals (chromium, copper, and zinc) were lower within the Subsite reach than upstream. Both the average and maximum invertebrate tissue concentrations for four non-Subsite-related metals (barium, cadmium, manganese and methylmercury) were lower in the Subsite reach than upstream. Additionally, non-Subsite-related mercury was detected in invertebrate tissue from upstream, but not within the Subsite reach.

The average total PCB invertebrate tissue concentration for samples collected from the Subsite reach were higher than from samples collected upstream of the Subsite (0.52 mg/kg versus 0.25 mg/kg).

In summary, PCB Aroclor 1248 in fish fillets average and maximum tissue concentration exceeded the respective upstream concentration by more than one order of magnitude. For crayfish, PCB Aroclor 1248, lead and nickel were detected in Subsite tissue, but not in upstream tissue. Also, PCB Aroclor 1242 was detected in whole fish tissue from the Subsite but not upstream.

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

As was noted in the “Ley Creek Hydrology” section, above, Ley Creek is a Class B stream. The Ley Creek drainage basin can generally be described as a highly urbanized area. Portions of the city of Syracuse and the towns of Cicero, Clay, DeWitt, Manlius, and Salina are located in the Ley Creek drainage basin. Also located in the Ley Creek watershed are interstate highways, a National Grid electrical transfer station, Syracuse International Airport, and the Air National Guard's Hancock Field. Large areas of impermeable surfaces in the Ley Creek watershed cause rapid runoff during storms and corresponding rapid rising of flow and water levels.

The Ley Creek Floodplain Area is a portion of the Federal Emergency Management Agency (FEMA) 100-year floodplain between Townline Road and Route 11 (excluding the Ley Creek PCB Dredgings subsite). Ley Creek is not currently used as a public water supply, and there is no commercial transportation use of the Creek. The Ley Creek Floodplain Area is zoned as mixed commercial and residential with some stretches of undeveloped land between the northern bank of Ley Creek and the New York State Thruway.

The National Grid Wetland is located in the northern portion of property owned by the utility company National Grid, directly to the west of the former GM-IFG facility. This wetland is an approximately 10-acre portion of a New York State-regulated wetland known as SYE-6. The National Grid property is currently zoned for industrial use.

The Factory Avenue Area is a narrow roadway shoulder and storm water drainage ditch located between the northern former GM-IFG facility property boundary and Factory Avenue. The area extends from the northwestern corner of the facility property to Townline Road. The Factory Avenue Area is characterized by maintained grass and is a corridor for overhead and underground utilities. Specifically, a natural gas pipeline and an Onondaga County sanitary sewer are present underground along this corridor. The Ley Creek PCB Dredgings subsite is located across Factory Avenue to the north of this area. This area is currently zoned for industrial use.

The Factory Avenue/LeMoyne Avenue Intersection Area is located north of Factory Avenue in the vicinity of LeMoyne Avenue down to the Route 11 Bridge. This area is currently zoned for commercial use.

SUMMARY OF SUBSITE RISKS

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario:

- *Hazard Identification* – uses the analytical data collected to identify the contaminants of potential concern (COPC) at the site for each medium, with consideration of a number of factors explained below;
- *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed;
- *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and
- *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the National Contingency Plan (NCP) as an excess lifetime cancer risk greater than 1 x 10^{-6} – 1 x 10^{-4} or a Hazard Index greater than 1.0; contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at the site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification

In this step, COPCs in each medium were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility, persistence and bioaccumulation. The area along the Ley Creek corridor mostly commercial properties and some residences, with some stretches of undeveloped land between the northern bank of Ley Creek and the New York State Thruway. Future land use along the creek is expected to remain the same. The baseline risk assessment began by selecting COPCs in surface water, floodplain soil, sediment and fish. The COCs are PCBs in sediment and soil. A comprehensive list of all COPCs can be found in the Baseline Human Health Risk Assessment (BHHRA) in the administrative record. Only the COCs are listed in Table 3.

Exposure Assessment

Consistent with Superfund policy and guidance, the Exposure Assessment assumes no remediation or institutional controls to mitigate or remove hazardous substance releases have been undertaken. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the site. The RME is defined as the highest exposure that is reasonably expected to occur at a site.

Ley Creek is a New York State Class B fresh surface water, which, pursuant to 6 NYCRR § 701.7, means the best usages for the Creek are primary and secondary contact recreation and fishing. Class B waters are suitable for fish, shellfish and wildlife propagation and survival. The Creek itself is not used commercially, although it is accessible for fishing or other recreation. While access to Ley Creek within the OU2 portion of the Subsite is unrestricted, it is difficult to reach in many areas because of thick vegetation. The fish species found during recent investigations include bluegill, pumpkinseed, shiners, bullhead and carp, most of them smaller than six inches in size.

The BHHRA evaluated potential risks to populations associated with both current and potential future land uses. Exposure pathways were identified for each potentially exposed population and each potential exposure scenario for the surface water, sediment, floodplain soils and fish. Based on the current zoning and anticipated future use, the risk assessment focused on a variety of possible receptors, including:

- Current and Future child fish consumers: children (0-6 years old) who may consume fish caught in Ley Creek.
- Current and Future Adult and Older Child Fisherperson: adults and older children/adolescents (6-18 years old) who may consume locally-caught fish, as well as come into contact with surface water, surface sediment in Ley Creek and surface soil in the floodplain of Ley Creek.
- Current and Future Adult and Adolescent Trespassers: adults and adolescents (12-18 years old) who may come in contact with surface water and surface soil in the Ley Creek Floodplain Area, National Grid Wetland and Factory Avenue Area.
- Future Dredge Worker: adults who may come in contact with surface water, surface and subsurface sediment and surface soil in Ley Creek and the Floodplain Area while performing periodic maintenance dredging of Ley Creek.
- Future Utility Workers: adults who may perform short-term intrusive work for underground utility installation, maintenance, or repair and may come in contact with surface and subsurface soil in the Ley Creek Floodplain, National Grid

Wetland and Factory Avenue Area.

Because of different activity patterns and the physical separation of the contaminated areas, the above receptors were evaluated for using exposure units:

- EU1: includes Ley Creek and Ley Creek Floodplain Area (Child Fish Consumer, Older Child Fisherperson, Adult Fisherperson and Dredge Worker).
- EU2: includes Ley Creek Floodplain, National Grid Wetland and Factory Avenue Area (Adolescent Trespasser, Adult Trespasser and Utility Worker).

A summary of all the exposure pathways included in the BHRRA can be found in Table 4 Typically, exposures are evaluated using a statistical estimate of the exposure point concentration, which is usually an upper-bound estimate of the average concentration for each contaminant, but in some cases may be the maximum detected concentration. A summary of the exposure point concentrations for the COCs in each medium can be found in Table 3, while a comprehensive list of the exposure point concentrations for all COPCs can be found in the BHHRA.

<u>Toxicity Assessment</u>

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncarcinogenic hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. This information is presented in Table 5. Additional toxicity information for all COPCs is presented in the BHHRA.

<u>Risk Characterization</u>

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the HQs for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (*i.e*., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncarcinogenic health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. A summary of the noncarcinogenic hazards associated with these chemicals for each exposure pathway is provided in Table 6. The potential for adverse, noncarcinogenic health effects was indicated for:

- Older Child and Adult Fisherpersons in EU1. The hazard was attributable to PCBs in surface sediment.
- Adolescent and Adult Trespassers in EU2. The hazard was attributable to PCBs in surface soil.
- Utility Workers in EU2. The hazard was attributable to PCBs in surface and subsurface soils.

The noncarcinogenic hazards for the COCs estimated for other receptors were less than 1. All noncarcinogenic hazards associated with exposure to surface water and fish consumption are within EPA's acceptable levels.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4}). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. Again, as stated in the National Contingency Plan, the acceptable risk range for site-related exposure is 1×10^{-6} to 1×10^{-4}.

There were no carcinogenic risks for COCs greater than 1×10^{-4}.

In summary, the results of the BHHRA indicate that there are noncarcinogenic health hazards to potentially exposed populations in all exposure units from exposure to sediment and soil contaminated with PCBs. The risks and hazards from the Ley Creek Floodplain Hot-Spot Exposure Area were not quantitatively evaluated in the BHHRA. Based on the screening of this area, the compounds detected would require preventative measures to protect public health under any scenario. The noncarcinogenic hazards and carcinogenic risks from all COPCs can be found in the BHHRA.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling

- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the risk assessment report.

Ecological Risk Assessment

A BERA was prepared for the Subsite in accordance with the NYSDEC's Fish and Wildlife Impact Analysis guidance and the EPA's Ecological Risk Assessment Guidance for Superfund. The BERA can be found in Appendix E of the RI report.

The process used for assessing Subsite-related ecological risks includes:

Problem Formulation - a qualitative evaluation of contaminant release, migration, and fate; identification of COCs, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study;

Exposure Assessment - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations;

Ecological Effects Assessment - literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors; and

Risk Characterization - measurement or estimation of both current and future adverse effects.

The BERA addressed several distinct exposure areas which were most likely to be utilized by ecological receptors. Those areas were defined as the Ley Creek Exposure Area, Ley Creek Floodplain Exposure Area, and the National Grid Wetland Exposure Area. Aquatic receptors were evaluated in the Ley Creek Exposure Area and terrestrial receptors were evaluated in the Ley Creek Floodplain Exposure Area and the National Grid Wetland Exposure Area.

Ley Creek Exposure Area

Potentially unacceptable risks to aquatic ecological receptors in the Ley Creek Exposure Areas were identified and assessed using quantitative lines of evidence. Screening results indicated that risks to the benthic invertebrate community are likely the result of direct contact exposures to total PCBs and PAHs.

Food chain models for piscivorous birds (belted kingfisher and great blue heron) and semi-piscivorous mammals (mink) were evaluated to determine the viability and function of the piscivorous bird and mammal communities at Ley Creek. Two constituents (methylmercury and total PCBs) had NOAEL-based hazard quotients (HQs)[9] greater than or equal to one for the belted kingfisher. Only one constituent (methyl mercury) had a NOAEL-based HQ greater than one for the great blue heron. However, methyl mercury is not a Subsite-related constituent. Therefore, risks to the piscivorous bird community from Subsite-related contaminants are considered to be minimal. Risk from food chain exposures to the semi-piscivorous mammal community (mink) are driven primarily by methyl mercury and total PCBs, with total PCBs having HQ exceedances of both NOAEL and LOAEL values. Risks from methyl mercury are not considered to be Subsite-related.

Ley Creek Floodplain Area

Potentially unacceptable risks to community-level ecological receptors of the Ley Creek Floodplain Area were identified by comparing soil and sediment concentrations to screening values protective of ecological receptors. Evaluation of risk to community-level receptors at the Ley Creek Floodplain Area indicated that there is a potential ecological risk and that the primary risk drivers to the terrestrial plant community are total PCBs and

[9] An HQ is the ratio of the potential exposure to a substance and the level at which no adverse effects are expected. If the HQ is calculated to be less than 1, then no adverse health effects are expected as a result of exposure.

metals (chromium, copper, lead and zinc). Risk to soil invertebrates is also driven by metals (chromium, copper, lead, and zinc) and total PCBs. The food chain model for insectivorous birds (American robin) indicated potential risk from metals and total PCBs. Risk to insectivorous mammals (short-tailed shrew) at the Ley Creek Floodplain Area is driven by metals (copper and zinc) and total PCBs.

National Grid Wetland Area

Potentially unacceptable risks to community-level ecological receptors of the National Grid Wetland Area were identified by comparing soil and sediment concentrations to screening values protective of ecological receptors. Evaluation of risk to community-level receptors at the National Grid Wetland Area indicated that there is a potential ecological risk and that the primary risk drivers to the terrestrial plant community are metals (chromium, copper, lead, and zinc) and total PCBs. Risk to soil invertebrates is also driven by metals (chromium, copper, nickel, and zinc) and total PCBs. The food chain model for insectivorous birds (American robin) indicated potential risk from metals, total PCBs and bis(2-ethylhexyl)phthalate. Risk to insectivorous mammals (short-tailed shrew) at the National Grid Wetland Area is driven by metals (chromium and copper) and total PCBs.

Summary of Human Health Risks and Ecological Risks

The results of the human health risk assessment indicate that the contaminated sediments and soils present an unacceptable human exposure risk and the ecological risk assessment indicates that the contaminated soils and sediments pose an unacceptable ecological exposure risk.

Based upon the results of the RI and the risk assessments, the NYSDEC and the EPA have determined that actual or threatened releases of hazardous substances present at this Subsite, if not addressed by the selected remedy or one of the other active measures considered, may present a current or potential threat to human health and the environment.

Basis for Action

Based upon the quantitative human-health risk assessment and ecological evaluation, the NYSDEC and the EPA have determined that actual or threatened releases of hazardous substances from the Subsite, if not addressed by the response action selected in this ROD, may present a current or potential threat to human health and the environment. The response action selected in the ROD is necessary to protect the public health or welfare of the environment from actual or threatened releases of contaminants into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect public health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels established using the risk assessments.

The following RAOs have been established for OU2:

- Reduce or eliminate any direct contact and ingestion threat to public health associated with contaminated soils and sediments;
- Minimize exposure of ecological receptors to contaminated soils and sediments; and
- Reduce the health hazards associated with eating fish from Ley Creek by reducing the concentration of contaminants in fish.

These RAOs are consistent with the current and reasonably anticipated future use of the discrete Subsite areas, continued industrial use for the neighboring National Grid property (except for ecological use within and adjacent to the wetland); ecological use for areas in the Ley Creek floodplain, except for areas of residential use where the residential use SCO is lower than the ecological use SCO (*i.e.*, chromium); and commercial use of the property along Factory Avenue.

Remediation Goals

To satisfy the direct-contact RAO, for the soils discussed in the "Results of the Remedial Investigation" section, above, NYSDEC and the EPA have adopted NYSDEC's 6 NYCRR Part 375 (NYSDEC Division of Environmental Remediation Environmental Remediation Programs, effective December 14, 2006) SCOs as the soil remediation goals for this action. SCOs are based on the lowest concentration for the protection of human health, ecological exposure or groundwater depending upon the anticipated future use of a site.

EPA and NYDEC have concluded that the 6 NYCRR Part 375 restricted use soil SCOs are protective for the anticipated current and future human health exposures for the majority of the areas to be addressed under OU2 (see Table 7). SCOs for unrestricted use are also identified (see Table 8) as remediation goals. Soil Alternative 2, below, identifies the areas that would be addressed using the restricted use SCOs. In keeping with Superfund policy, the FS also considered whether using the unrestricted use SCOs might result in a more comprehensive and effective remedy over the long term at a comparable cost (Alternative 3).

There are no federal or New York State cleanup standards for PCB contamination in sediment. For sediments, a 1 mg/kg PCB remedial action objective will be applied, as it is a previously-selected sediment cleanup goal at New York State hazardous waste sites and has been determined to be protective of human health and the environment for this Subsite. In addition, the 1 mg/kg PCB sediment cleanup objective is consistently evaluated and often applied when remediating PCB-contaminated sediments in New York State. PCBs are the primary ecological risk driver and are collocated with the majority of the other sediment COCs. As discussed in the "Summary of Remedial Alternatives" section below, the FS also considered a remediation goal of 0.28 mg/kg that would remediate PCBs in sediments to a level consistent with the average upstream PCB concentration in Ley Creek.

A fish consumption advisory, which is updated annually by the New York State Department of Health (NYSDOH), currently indicates that the consumption of fish from Onondaga Lake and its tributaries (including Ley Creek) should be limited because of, in part, PCBs and mercury which have been found to be present in the tissue of certain Onondaga Lake fish.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA § 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA § 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state ARARs, unless a waiver can be justified pursuant to CERCLA § 121(d)(4), 42 U.S.C. § 9621(d)(4).

Capping was screened out in the FS due to limited implementability. Sediment depths to the hardpan in the Creek are generally two feet or less. Excavation of at least two feet of the sediment would be required in order to install a protective sediment cap and maintain the existing bathymetry for flood control purposes. This would remove the contamination and, thus, eliminate the need for capping of the sediment. In addition, while there are some limited areas (within the National Grid Wetland Area) where soil contamination is present at depths of 8-10 feet, contamination is generally located within the top two feet of soil. If the installation of a soil cap in the floodplains was to occur, then soil excavation to a depth of two feet would be necessary, prior to installing a protective soil cover, to preserve flood control in the floodplain area. A two-foot excavation would result in removal of the contamination in most areas and would, in essence, render the installation of a cap unnecessary.

The remedial alternatives are as follows:

Sediment Alternative 1: No Action

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the problem of sediment contamination at the Subsite.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA would require that the remedy be reviewed at least once every five years. If justified by the review, remedial actions may be required in the future to remove, treat or contain the wastes.

Capital Cost:	$0
Annual O&M[10] Cost:	$0
Present-Worth Cost:	$0
Construction Time:	none

Sediment Alternative 2: Monitored Natural Recovery

This alternative would rely upon monitored natural recovery (MNR) to achieve the RAOs related to the Ley Creek sediments from Townline Road to the Route 11 Bridge. The primary mechanisms of natural recovery that are expected to be acting to lessen the PCB concentrations in Ley Creek include chemical transformation, reduction in contaminant mobility/bioavailability, physical isolation and dispersion.

Long-term modeling and monitoring of the sediment, water column, and biota would be included under this alternative to confirm that contaminant reduction is occurring and that the reduction is achieving the RAOs. Monitoring would be conducted after completion of the other components of the OU remedy (*e.g.*, soils that might be an ongoing source of PCBs to the stream) to determine the effectiveness of MNR over the long term.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA would require that the remedy be reviewed at least once every five years.

[10] “O&M” denotes “operation and maintenance.”

Capital Cost:	$0
Annual O&M Cost:	$24,000
Present-Worth Cost:	$300,000
Construction Time:	none

Sediment Alternative 3: Mechanical Excavation to Achieve 1 mg/kg PCB

This alternative would include mechanical excavation of contaminated sediment in the GM-IFG OU2 reach of Ley Creek exhibiting PCB concentrations greater than 1 mg/kg. Because PCBs are collocated with the majority of other COCs, and are the primary risk driver for all pathways for this Subsite (see the "Summary of Site Risks" section, above), they would be used as an indicator compound to ensure that the sediment cleanup goals are achieved. The estimated volume of material would be 9,600 cubic yards (CY) based on PCB concentrations in sediment exceeding the 1 mg/kg sediment cleanup criteria. Of the 9,600 CY of sediment exceeding 1 mg/kg PCB, it is estimated that 550 CY of sediment would require disposal at a TSCA-compliant facility. It is assumed that for reaches indicated for sediment removal, the sediment would be removed from bank to bank, to the extent practicable, until the unconsolidated bed material is reached. For volume estimation, an average excavation depth of 1.25 feet was assumed. It is assumed that excavated sediment would require dewatering prior to final off-site disposal, and that water treatment would be required prior to discharge.

Habitat restoration of Ley Creek would consist of placement of at least 0.5 feet of substrate similar to the existing sediments over disturbed areas and restoration of vegetation. The specific thickness and substrate material to be used for the backfill in these areas would be determined during the remedial design as part of a habitat restoration plan.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA would requires that the remedy be reviewed at least once every five years.

Capital Cost:	$6,320,000
Annual O&M Cost:	$16,000
Present-Worth Cost:	$6,520,000
Construction Time:	two years

Sediment Alternative 4: Mechanical Excavation to Achieve 0.28 mg/kg PCB[11]

This alternative would include the mechanical excavation of sediment exhibiting concentrations exceeding the average upstream PCB concentration of 0.28 mg/kg within Ley Creek. Because PCBs are collocated with the majority of other COCs, and are the primary risk driver for all pathways for this Subsite, they would be used as an indicator compound to ensure that the sediment cleanup goals are achieved. The estimated volume of target material associated with sediment removal in this alternative would be 13,200 CY. Of the 13,200 CY of sediment exceeding 0.28 mg/kg PCB, it is estimated that 550 CY of sediment would require disposal at a TSCA-compliant facility. Excavation limits for Sediment Alternative 4 assume removal of the full depth of sediments from bank to bank within Ley Creek between Townline Road and Route 11. For volume estimation, an average excavation depth of 1.25 feet was assumed. It is assumed that excavated sediment would require dewatering prior to final off-site disposal, and that water treatment would be required prior to discharge.

Habitat restoration of Ley Creek would consist of placement of at least 0.5 feet of substrate similar to the existing sediments over disturbed areas and restoration of vegetation. The specific thickness and substrate material to be used for the backfill in these areas would be determined during the remedial design as part of a habitat restoration plan.

Because this alternative would be expected to remove all of the sediment, and thus all of the contaminants in on-site sediment, a CERCLA five year review would not be required for this portion of the remedy.

Capital Cost:	$8,710,000
Annual O&M Cost:	$16,000
Present-Worth Cost:	$8,910,000
Construction Time:	two years

Soil Alternative 1: No Action

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the problem of soil contamination at the Subsite.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA would require that the

[11] 0.28 mg/kg PCB is the average upstream sediment concentration.

remedy be reviewed at least once every five years. If justified by the review, remedial actions may be required in the future to remove, treat or contain the contaminated soils.

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	none

Soil Alternative 2: Soil Excavation to Achieve Restricted SCOs

This alternative would include excavation of surface and subsurface soil to meet the restricted SCOs (see Table 7) consistent with current and reasonably anticipated future land use of discrete Subsite areas as follows:

- continued industrial use for the neighboring National Grid property (except for ecological use within and adjacent to the wetland);
- ecological use for areas in the Ley Creek floodplain, except for areas of residential use where the residential use SCO is lower than the ecological use SCO (*i.e*., chromium); and
- commercial use of the property along Factory Avenue.

The estimated volume of soil to be excavated under this alternative would be 15,000 CY. Most excavations are anticipated to be approximately 1 to 4 feet in depth; with some limited areas excavated to depths as deep as 6 feet within the Ley Creek floodplain hot spot.

It is assumed that National Grid Wetland soil/sediments would require dewatering prior to final soil disposal, and that water treatment would be required prior to discharge to Ley Creek.

Following excavation, the excavated soil and sediment would be subjected to Toxic Characteristic Leaching Procedure (TCLP) testing.[12] Those soils and sediments that are determined to be characteristic hazardous waste and are non-TSCA waste (*i.e.,* less than 50 mg/kg PCBs) would be disposed of at an appropriate Resource Conservation and Recovery Act (RCRA)-compliant facility. Those soils that contain PCBs greater than 50 mg/kg would be disposed of at an off-site TSCA-compliant facility. Those soils that

[12] TCLP testing is a soil sample extraction method for chemical analysis employed as an analytical method to simulate contaminant leaching. The testing methodology is used to determine if a waste is a characteristic hazardous waste under RCRA.

are not TSCA-regulated and are not characteristic hazardous waste would be properly disposed of either locally or at an appropriate nonlocal facility.

Appropriate controls and monitoring (*e.g.*, community air monitoring) would be utilized to ensure that during remediation activities, airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.

For costing purposes, approximately 5,800 CY of the soil excavated from the National Grid Wetland, and approximately 1,800 CY of material excavated from the vicinity of Factory Avenue are assumed to exhibit PCB concentrations above 50 mg/kg, and therefore, would need to be disposed of at an off-site TSCA-compliant facility. The remainder of excavated soils would be disposed at an off-site, permitted non-hazardous waste disposal facility.

There are limited areas where underground utilities are present at the Subsite. Due to the potential health and safety threat of excavating around and beneath underground utilities, soil may remain at concentrations above restricted SCOs in some areas following excavation. This would be addressed by a soil cover, institutional controls and as part of the Site Management Plan (SMP).

Clean fill meeting the requirements of the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10), Appendix 5[13] would be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the Subsite. With the exception of the Factory Avenue Area and Factory Avenue/LeMoyne Avenue Intersection Area excavations, excavated areas would be restored with clean substrate and vegetation as per an approved habitat restoration plan developed as part of the design. Excavated areas along Factory Avenue would be restored with a cover which would consist of an indicator fabric layer, as needed (*e.g.*, for soil in the vicinity of underground utilities), overlain by 12 inches of clean soil (minimum) and a top layer consisting of vegetation, asphalt, or gravel, as appropriate, for the area being restored.

A SMP would provide for the proper management of all post-construction remedy components. Specifically, the SMP would describe procedures to confirm that the requisite engineering (*e.g.*, demarcation layer) and institutional controls are in place and that such controls continue to protect public health and the environment. The SMP would also detail the following: the provision for the management of future excavations in areas where contamination remains; an inventory of any use restrictions; the necessary provisions for the implementation of the requirements of any above-noted environmental easements and/or restrictive covenants; a provision for the performance of the O&M required for the remedy; and a provision that a property owner or party implementing the

[13] Allowable Constituent Levels for Imported Fill or Soil.

remedy submit periodic certifications that the institutional and engineering controls are in place.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA would require that the remedy be reviewed at least once every five years.

Capital Cost:	$7,410,000
Annual O&M Cost:	$16,000
Present-Worth Cost:	$7,610,000
Construction Time:	one year

Soil Alternative 3: Soil Excavation to Achieve Unrestricted SCOs

This alternative would include excavation of surface and subsurface soil exhibiting concentrations greater than SCOs for unrestricted use (see Table 8). It should be noted that the presence of underground utilities are likely to hinder full excavation along Factory Avenue and on the National Grid property near the access road.

The approximate volume of soil associated with Soil Alternative 3 would be 31,500 cubic yards with average excavation depths ranging from 0 to 10 feet bgs.

It is assumed that National Grid Wetland soil/sediment would require dewatering prior to final soil disposal, and that water treatment would be required prior to discharge to Ley Creek.

Following excavation, the excavated soil and sediment would be subjected to TCLP testing. Those soils and sediments that are determined to be characteristic hazardous waste and are non-TSCA waste (*i.e.,* less than 50 mg/kg PCBs) would be disposed of at an appropriate RCRA-compliant facility. Those soils that contain PCBs greater than 50 mg/kg would be disposed of at an off-site TSCA-compliant facility. Those soils that are not TSCA-regulated and are not characteristic hazardous waste would be properly disposed of either locally or at an appropriate non-local facility.

Appropriate controls and monitoring (*e.g*., community air monitoring) would be utilized to ensure that during remediation activities, airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.

For cost purposes, approximately 5,800 CY of the soil excavated from the National Grid Wetland and approximately 1,800 CY of material excavated from the vicinity of Factory Avenue are assumed to exhibit PCB concentrations above 50 mg/kg and therefore would need to be disposed of at an off-site TSCA-compliant facility. The remainder of excavated soils would be disposed at an off-site, permitted non-hazardous waste disposal facility.

There are limited areas where underground utilities are present at the Subsite. Due to the potential health and safety threat of excavating around and beneath underground utilities, soil may remain at concentrations above unrestricted SCOs in some areas following excavation. In such a case, a soil cover, institutional controls and a SMP would address such area(s).

Clean fill meeting the requirements of DER-10, Appendix 5 would be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the Subsite. With the exception of the Factory Avenue Area and Factory Avenue/LeMoyne Avenue Intersection Area excavations, excavated areas would be restored with clean substrate and vegetation as per an approved habitat restoration plan developed as part of the design. Excavated areas along Factory Avenue would be restored with a cover which would consist of an indicator fabric layer, as needed (*e.g*., for soil in the vicinity of underground utilities), overlain by 12 inches of clean soil (minimum) and a top layer consisting of vegetation, asphalt, or gravel, as appropriate, for the area being restored.

A SMP would provide for the proper management of all post-construction remedy components. Specifically, the SMP would describe procedures to confirm that the requisite engineering (*e.g*., demarcation layer) and institutional controls are in place and that such controls continue to protect public health and the environment. The SMP would also detail the following: the provision for the management of future excavations in areas where contamination remains; an inventory of any use restrictions; the necessary provisions for the implementation of the requirements of any above-noted environmental easements and/or restrictive covenants; a provision for the performance of the O&M required for the remedy; and a provision that a property owner or party implementing the remedy submit periodic certifications that the institutional and engineering controls are in place.

While the goal of this action would be to achieve the unrestricted use SCOs, the presence of underground utilities is likely to prevent this outcome, resulting in residual contaminated soils, in utility rights-of-way, above levels that allow for unrestricted use and unlimited exposure. Therefore, contaminants remaining on-site, CERCLA would require that the remedy be reviewed at least once every five years.

Capital Cost:	$13,200,000
Annual O&M Cost:	$16,000
Present-Worth Cost:	$13,400,000

Construction Time: one year

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of the nine evaluation criteria in the FS report. This section profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other alternatives under consideration.

***Threshold Criteria** - The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet to be eligible for selection as a remedy.*

---

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

In order to be protective, the sediment remedial alternatives considered would need to address the migration of PCBs from sediments; control contaminated sediment transport; and reduce potential exposures to contaminated sediments, whereas, the soil remedial alternatives considered would need to reduce potential exposures to contaminated soils. Each of the action alternatives presented (Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3) would protect human health and the environment via removal (excavation) of contaminated sediments and soils, respectively, and for the soil alternatives, covering residual contaminated soils as needed. Sediment Alternative 1 and Soil Alternative 1 (the No Further Action alternatives) would not be protective of human health and the environment because they would not address the PCBs in the sediments and soil, which present human health and ecological risks. It is highly uncertain whether the limited action alternative, Sediment Alternative 2 (Monitored Natural Recovery) would eventually lead to PCB levels in sediment that are protective of human health and the environment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121 (d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). <u>Applicable requirements</u> are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

<u>Relevant and appropriate requirements</u> are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for an invoking waiver.

SCOs are New York State cleanup standards designed for the protection of groundwater, ecological resources and human health, and are identified in 6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6, effective December 14, 2006. There are currently no federal or state promulgated standards for contaminant levels in sediments. There are, however, other federal or state advisories, criteria, or guidance (which are used as TBC criteria). Specifically, NYSDEC's sediment screening values are a TBC criteria.

The chemical-specific ARARs for PCBs in the water-column are 0.014 µg/L for protection of aquatic life (criterion continuous concentration [chronic] federal water quality criterion for fresh water), 0.00012 µg/L (NYS standard for protection of wildlife) and the 0.000001 µg/L (New York State standard for protection of human consumers of fish). These chemical-specific ARARs for the surface water would not be expected to be met by the implementation of any of the alternatives. This is due to upstream surface water concentrations that likely exceed these ARARs due to the ubiquitous nature of PCBs, especially within an urban drainage system.

Because the contaminated sediments and soils would not be addressed under Sediment Alternative 1 and Soil Alternative 1, these alternatives would not achieve the sediment cleanup goals, the sediment screening criteria, nor the SCOs. There is a high degree of uncertainty that Sediment Alternative 2 would achieve the sediment cleanup goals and, therefore, little evidence that it would be effective in the long-term.

Soil Alternatives 2 and 3 would attain the respective SCOs. Sediment Alternatives 3 and 4 would meet their respective cleanup goals for PCBs in sediment. Sediment Alternative 4, which would meet the sediment screening criteria as achieving the background concentration for PCBs, would require removal of all sediment in the Creek. During sediment excavation for Sediment Alternatives 3 and 4, any increases in PCB concentrations in the surface water of Ley Creek due to excavation would be expected to be short term. Sufficient engineering controls would be utilized during excavation to prevent or minimize resuspension of contaminated sediments and exceedances of surface water ARARs (above background conditions) downstream of the work zone. Furthermore, compliance with the discharge limits (to be established by NYSDEC, as needed) should ensure that there are no exceedances of surface water ARARs caused by the discharge from on-site water treatment to the extent practicable. Also, any water quality impacts would meet the substantive water quality requirements imposed by New York State on entities seeking a dredged material discharge permit under Section 404 of the Clean Water Act (CWA). For the action alternatives, other action-specific ARARs to be met include CWA Sections 401 and 402; the Rivers and Harbors Act Section 10; the New York Environmental Conservation Law (ECL) Article 15 Water Resources, Article 17 Water Pollution Control and Article 27 Collection, Treatment and Disposal of Refuse and Other Solid Waste; and associated implementing regulations.

Under Soil Alternatives 2 and 3, clean fill meeting the requirements of the DER-10, Appendix 5 would be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the Subsite. Because Soil Alternatives 2 and 3 would involve the excavation of contaminated soils, and Sediment Alternatives 3 and 4 would require dewatering and processing of sediments, compliance with fugitive dust regulations would be addressed as necessary. In addition, the Soil Alternatives 2 and 3 and Sediment Alternatives 3 and 4 would be subject to New York State and federal regulations related to the transportation and off-site treatment/disposal of wastes.

Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 would comply with RCRA, which is the federal law addressing the storage, transportation and disposal of solid and hazardous waste. NYSDEC implements RCRA in New York under ECL Article 27. Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 would comply with TSCA's PCB cleanup and disposal regulations (40 CFR Part 761).

***Primary Balancing Criteria** - The next five criteria, criteria 3 through 7, are known as "primary balancing criteria." These criteria involve the assessment of factors between response measures so that the best option will be chosen, given site-specific data and conditions.*

---

3. Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.

Sediment Alternatives 1 and 2 and Soil Alternative 1 would not provide long-term effectiveness or permanence because they do not take any action to prevent exposures to or mobilization of PCBs.

Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 are each effective in the long-term and each provides permanent remediation, to varying degrees, by removal and off-site disposal of contaminated sediments and soils. Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 would provide increasing degrees of long-term effectiveness and permanence as each successive alternative calls for further removals of sediment or soil, respectively.

For Soil Alternatives 2 and 3, institutional controls would be needed to restrict intrusive activities in areas where soil contamination remains. Even implementation of Soil Alternative 3, which calls for the excavation of soils exceeding unrestricted SCOs, would likely result in some soils remaining in the vicinity of buried utilities that would warrant institutional controls. The data does not indicate that Sediment Alternative 4 would achieve added benefit over Sediment Alternative 3 to those ecological receptors identified in the BERA as showing risk from PCBs in the sediments.

Because Sediment Alternatives 1, 2 and 3 and all of the soil alternatives would result in residual contamination, five-year reviews would be required. In addition, the fish advisory that applies to Onondaga Lake and all tributaries up to the first impassible barrier would continue to apply to this reach of Ley Creek.

Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 would maintain reliable protection of public health and the environment over time.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

None of the alternatives include treatment.

Sediment Alternatives 1 and 2 and Soil Alternative 1 would provide no reduction in toxicity, mobility or volume. Under each of the other alternatives, the mobility of contaminants would be reduced to varying degrees via excavation and proper disposal of excavated soils or sediments.

5. Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Sediment Alternatives 1 and 2 and Soil Alternative 1 do not involve any construction work, so there would be no short-term impacts.

Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 could present some risk of limited adverse impacts to remediation workers through dermal contact and inhalation (through fugitive dust) related to sediment or soil excavation activities. Noise from the excavation work associated with the action alternatives could impact remediation workers and nearby residents. These potential short-term impacts would, however, be mitigated by following appropriate health and safety protocols, the implementation of engineering controls developed during remedial design, and by following appropriate construction practices.

A wetlands assessment and restoration plan would be prepared for any wetlands impacted or disturbed by the remedial activities. CWA Section 404, Protection of Wetlands E.O. 11990, EPA's Statement of Procedures on Floodplain Management and Wetlands Protection and Management Practices (according to Federal Register Vol. 51, No. 219, Part 330.6) will be followed to minimize unavoidable impacts to wetlands to the maximum extent practicable while designing/implementing the remedy.

There would be some short-term impacts to aquatic and upland wildlife habitat areas for each of the action alternatives due to excavation of soil and sediment. These impacts would be greatest for Sediment Alternative 4, because the entire reach of Ley Creek would be dredged from bank to bank, and Soil Alternative 3, because the greatest surface area of upland habitat would be excavated. Habitat reconstruction and appropriate monitoring provisions would be implemented to mitigate these short-term impacts. Potential for exposures to fish and other biota due to resuspension of sediments caused by excavation under Sediment Alternatives 3 and 4 would be minimized through the use of engineering controls developed during remedial design and appropriate construction practices.

Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 include off-site transport of several thousand CY of contaminated sediments or soils, but this would have minimal impact on local traffic due to accessibility and proximity to truck routes and the New York State Thruway.

There is a potential for increased storm water runoff and erosion during construction of Sediment Alternatives 3 and 4 and Soil Alternatives 2 and 3 that would require management to prevent or minimize any adverse water quality impacts.

Because no actions would be performed under Sediment Alternative 1 and Soil Alternative 1, there would be no time required for implementation. Sediment Alternative 2 requires no construction, but would require some time to develop a monitoring plan. Sediment Alternatives 3 and 4 are estimated to be completed within two years from the start of construction, and Soil Alternatives 2 and 3 are estimated to be completed within one year from the start of construction.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Sediment Alternative 1 and Soil Alternative 1 are the easiest alternatives to implement, as there is no action to undertake. Sediment Alternative 2 is the next easiest alternative to implement because it only provides for Subsite monitoring, which is readily implementable.

Sediment Alternatives 3 and 4 and Soil Alternative 2 are readily implementable. Requisite equipment and services for each of these alternatives are readily available and have been used successfully at numerous sites to remediate contaminated soils and sediment. However, attaining unrestricted SCOs called for by Soil Alternative 3 is likely not implementable due to the presence of underground utilities that would likely require an undisturbed buffer zone in order to prevent exposures to site workers and/or damage to utilities.

7. Cost

Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs.

The present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period.

The estimated capital, annual O&M, and present-worth costs for each of the alternatives are presented below. The estimated costs for the action alternatives are directly related to the given alternative's corresponding total volumes of soil and sediments to be excavated.

Alternatives	Capital	Annual O&M	Total Present Worth
Sediment Alternative 1: No Action	$0	$0	$ 0
Sediment Alternative 2: MNR	$0	$24,000	$300,000
Sediment Alternative 3: Excavation to 1 mg/kg PCB	$6,320,000	$16,000	$6,520,000
Sediment Alternative 4: Excavation to 0.28 mg/kg PCB	$8,710,000	$16,000	$8,910,000
Soil Alternative 1: No Action	$0	$0	$ 0
Soil Alternative 2: Excavation to 1 mg/kg PCB	$7,410,000	$16,000	$7,610,000
Soil Alternative 3: Excavation to 0.1 mg/kg PCB	$13,200,000	$16,000	$13,400,000

***Modifying Criteria** - The final criteria 8 and 9, are known as "modifying criteria." Community and support agency acceptance are factors that are assessed by reviewing comments received during the public comment period, including new information made available after publication of the proposed plan that significantly changes basic features of the remedy with respect to scope, performance, or cost.*

8. State Acceptance

Indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

NYSDEC is the lead agency for this Subsite. The EPA has determined that the selected remedy meets the requirements for a remedial action as set forth in CERCLA Section 121, 42 USC § 9621. As such, for the purpose of satisfying this remedy selection criterion of the NCP, NYSDEC, on behalf of New York State, supports the selected remedy. NYSDOH also supports the selection of this remedy; its letter of concurrence is attached (see Appendix IV).

9. Community Acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

Comments received during the public comment period are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site, wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or will present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using those remedy-selection criteria that are described above. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Based upon EPA's guidance, PCBs above 500 mg/kg in industrial areas that cannot be reliably contained and would present a significant risk to human health or the environment should exposure occur are generally considered a principal threat waste. There were only eight discontinuous soil sampling locations within the National Grid Wetland and Factory Avenue Areas where PCB concentrations exceeded 500 mg/kg (most soils are below 50 mg/kg PCBs); therefore, overall, these soils do not constitute a principal threat waste.

Soil Alternatives 2 and 3 would address the PCB-contaminated soil through excavation.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives and public comments, NYSDEC and the EPA have determined that Sediment Alternative 3 (mechanical excavation to achieve 1.0 mg/kg PCB), and Soil Alternative 2 (soil excavation to achieve restricted SCOs), best satisfy the requirements of CERCLA Section 121, 42 U.S.C. § 9621, and provide the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, set forth at 40 CFR § 300.430(e)(9).

With respect to soils, both Soil Alternative 2 and Soil Alternative 3 are protective because their respective soil cleanup objectives are at least as stringent as the NYSDEC restricted use SCOs. The additional environmental benefit associated with Soil Alternative 3 relative to Soil Alternative 2 would not be commensurate with the additional cost ($5.8 million), because the reasonably anticipated future use for the Subsite is a mixture of restricted uses, including industrial, commercial and residential, and Soil Alternative 3 may still result in remaining concentrations above unrestricted SCOs in areas where underground utilities are present.

With respect to sediment, Sediment Alternative 3 and Sediment Alternative 4 are protective because their respective sediment cleanup values are at least as stringent as the risk-based sediment cleanup value derived from the BERA. Data does not indicate that using a cleanup objective of 0.28 mg/kg instead of 1 mg/kg would achieve added benefit to those ecological receptors identified in the BERA as showing risk from PCBs in the sediments. Therefore, while additional sediment would be removed under Sediment Alternative 4, at additional cost ($2.4 million), both alternatives are protective.

The selected remedy is technically and administratively feasible and implementable. All of the necessary personnel, equipment and services required are expected be readily available.

The selected remedy would provide the best balance of tradeoffs among alternatives with respect to the evaluating criteria. The EPA and NYSDEC believe that the selected remedy would be protective of public health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

Description of the Selected Remedy

The selected remedy for OU2 of the Subsite, Sediment Alternative 3: Mechanical Excavation to Achieve 1 mg/kg PCB and Soil Alternative 2: Soil Excavation to Achieve

Restricted SCOs, includes the following components:

- Mechanical excavation of an estimated 9,600 CY of sediment in Ley Creek exceeding 1 mg/kg PCBs. It is assumed that the excavation will be from bank-to-bank and the depths of excavation will be to the unconsolidated bed material, to the extent practicable. Figure 8 depicts the areas of the Creek where sediment will be excavated. The areal footprint of areas to be excavated will be refined during the remedial design.
- Excavation of an estimated 15,000 CY of surface and subsurface floodplain soil to meet the restricted SCOs (see Table 7) consistent with current and reasonably anticipated future land use of discrete Subsite areas as follows:[14]
    - continued industrial use for the neighboring National Grid property (except for ecological use within and adjacent to the wetland);
    - ecological use for areas in the Ley Creek floodplain, except for areas of residential use where the residential use SCO is lower than the ecological use SCO (*i.e*., chromium); and
    - commercial use of the property along Factory Avenue.
- Transport of the excavated Creek and wetland sediments to a staging area where they will be dewatered. The water drained from the sediments will require treatment prior to discharge.
- Transport of the excavated contaminated soils and sediments containing greater than 50 mg/kg of PCBs to a TSCA-compliant facility.
- Transport of those soils and sediments which fail Toxic Characteristic Leaching Procedure testing[15] and are determined to be characteristic hazardous waste and are non-TSCA waste (*i.e.,* less than 50 mg/kg PCBs) to an off-Site RCRA-compliant facility.
- Transport of those soils and sediments that are non-TSCA-regulated (less than 50 mg/kg of PCBs) and are not characteristic hazardous waste to a RCRA-compliant facility.[16]

---

[14] Most soil excavations are anticipated to be 1 to 4 feet in depth; with some limited areas excavated to depths as deep as 6 feet within the Ley Creek floodplain hot spot. The locations and assumed excavations for soil removal are illustrated on Figures 4 through 7. Confirmatory sampling will be conducted to ensure the excavations are complete.

[15] TCLP testing is a soil sample extraction method for chemical analysis employed as an analytical method to simulate contaminant leaching. The testing methodology is used to determine if a waste is a characteristic hazardous waste under RCRA.

[16] The September 30, 2014 ROD for the Lower Ley Creek subsite called for either local or non-

- Clean fill meeting the requirements of DER-10, Appendix 5 will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the Subsite. With the exception of the Factory Avenue Area and Factory Avenue/LeMoyne Avenue Intersection Area excavations, excavated areas will be restored with clean substrate and vegetation as per an approved habitat restoration plan developed as part of the design. Excavated areas along Factory Avenue will be restored with a cover which will consist of an indicator fabric layer, as needed, overlain by 12 inches of clean soil (minimum) and a top layer consisting of vegetation, asphalt, or gravel, as appropriate, for the area being restored.
- Appropriate controls and monitoring (*e.g.*, community air monitoring) will be utilized to ensure that during remediation activities, airborne particulate and volatile organic vapor concentrations surrounding the excavation area are acceptable.
- Habitat restoration of Ley Creek excavated areas which will consist of the placement of at least 0.5 feet of substrate similar to the existing sediments (*e.g.*, sand and gravel) over disturbed areas and restoration of vegetation. The specific thickness and substrate material to be used for the backfill in these areas will be determined during the remedial design as part of a habitat restoration plan. The main goal of the habitat restoration will be to restore the habitats affected by the remedy, and the restoration will meet the substantive requirements of 6 NYCRR Part 608 and 663. A habitat assessment will be performed to support the restoration design. The habitat assessment will include an assessment of the Ley Creek removal areas for mussels and will determine any actions necessary (if any) to minimize impacts to existing populations. The habitat restoration plan will also describe the specific design for areas impacted by the remediation of sediments and soils and determine the appropriate plantings (including types and locations) necessary to restore habitats. The habitat restoration plan will also include the necessary requirements for monitoring restoration success and for needed restoration maintenance. Monitoring requirements will be determined during the design.
- Institutional controls in the form of environmental easements will be used to restrict intrusive activities in areas where contamination remains unless the activities are in accordance with an approved SMP.
- The SMP will provide for the proper management of all post-construction remedy components. Specifically, the SMP will describe procedures to confirm that the

---

local disposal of the excavated soils and sediments with PCB concentrations less than 50 mg/kg. Should local disposal of the soils and sediments be employed at the Lower Ley Creek subsite, consideration will be given to similarly disposing of the excavated soil and sediment from the GM-IFG Subsite.

requisite engineering (*e.g.,* demarcation layer) and institutional controls are in place and that such controls continue to protect public health and the environment. The SMP will also detail the following: the provision for the management of future excavations in areas where contamination remains; an inventory of any use restrictions; the necessary provisions for the implementation of the requirements of any above-noted environmental easements and/or restrictive covenants; a provision for the performance of the operation and monitoring required for the remedy; and a provision that a property owner or party implementing the remedy submit periodic certifications that the institutional and engineering controls are in place.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with the EPA Region 2's Clean and Green Energy Policy and NYSDEC's DER-31 Green Remediation Policy.[17] Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and management of the remedy. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Reduction in vehicle idling, including both on and off road vehicles and construction equipment during construction;
- Use of Ultra Low Sulfur Diesel;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

Because this remedy is anticipated to result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted

[17] See http://epa.gov/region2/superfund/green_remediation and http://www.dec.ny.gov/docs/-remediation_hudson_pdf/der31.pdf

exposure, a statutory review will be conducted at least every five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

It has been determined that remediation is necessary in the portion of Ley Creek that is included in OU2 of the Subsite. Because this area is located immediately upstream of the Lower Ley Creek subsite, the OU2 remedy would need to be implemented prior to the implementation of this Lower Ley Creek subsite remedy to prevent the potential for recontamination (if Lower Ley Creek were addressed first) or engineering controls to prevent recontamination would need to be implemented.

Summary of the Estimated Remedy Costs

The estimated capital cost of the selected remedy is $13,730,000; the annual O&M is $32,000 and the total present-worth costs (using a seven percent discount rate and 30 years of O&M) is $14,130,000. Table 9.2 provides the basis for the cost estimates for Sediment Alternative 3 and Soil Alternative 2.

It should be noted that these cost estimates are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy.

Expected Outcomes of the Selected Remedy

Land uses associated with the properties are not anticipated to change as a result of the implementation of the selected remedy.

The results of the HHRA indicate that PCBs present a potentially unacceptable noncancer hazard for recreational receptors engaging in specific activities (*e.g.*, child and adult fisherpersons exposed to soils and sediments) and to receptors that would be involved in intrusive work such as utility workers. Under the selected remedy, the removal of the PCB-contaminated soils and sediment will reduce the potential risks to human health and the environment to acceptable levels.

The results of the BERA indicate that the Subsite, if not remediated, poses an unacceptable ecological exposure risk.

The application of the 1 mg/kg cleanup level for PCBs in sediments will result in the excavation of most of the creek bed to the native clay. At least six inches of cover material that is suitable for habitat will be placed in all excavated sediment areas. As a result, the sediment remedy is expected to result in a significant reduction in the concentration of PCBs and other site-related contaminants in the sediment over the site reach, thereby reducing exposure of human and ecological receptors to contaminated sediment and fish.

The application of the 1 mg/kg cleanup level for PCBs in soils will result in the reduction of exposure of human and ecological receptors to contaminated soil.

Under the selected remedy, potential risks to human health and the environment will be reduced to acceptable levels. It is estimated that it will require one year to achieve soil cleanup levels and one year to achieve cleanup levels in the sediment.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, NYSDEC and the EPA have determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The results of the risk assessments indicate that, if no action is taken, the continued exposure at the Subsite poses an unacceptable increased future ecological and human health risk.

The selected remedy will reduce exposure levels to protective levels below the HI of 1 for noncarcinogens in the soils and sediments. The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot be mitigated. The selected remedy will be protective of human health and the environment in that the excavation and disposal of the contaminated soil and sediment will mitigate a source of contamination to Onondaga Lake and to the local fisheries. Combined with institutional controls, the selected remedy will provide protectiveness of human health and the environment over both the short- and long-term.

Compliance with ARARs and Other Environmental Criteria

The selected remedy will comply with the location-specific and action-specific ARARs identified, as well as the two out of four chemical-specific ARARs. Because of technical impracticability, two chemical-specific ARARs pertaining to water column concentrations (0.001 nanograms per liter [ng/L] New York State water quality PCB standards for the protection of human consumers of fish and 0.12 ng/L for the protection of wildlife) are hereby waived (see CERCLA Section 121(d)(4)(c) and 40 C.F.R. 300.430(f)(1)(ii)(C)(3)).

The ARARs, TBCs and other guidelines for the selected remedy are provided in Table 10.

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: the following: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective and will achieve the cleanup levels in the same amount of time in comparison to the more costly alternatives. Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of the capping alternatives and fish and sediment monitoring using a seven percent discount rate and a 30-year interval. The estimated capital, annual O&M, and total present-worth costs for the selected remedy, assuming local disposal, are $13,730,000, $32,000, and $14,130,000, respectively.

Both Soil Alternatives 2 and 3 would effectively achieve their respective SCOs. However, Soil Alternative 3 (meeting unrestricted soil cleanup objectives) is significantly more expensive than Soil Alternative 2, which will meet the current and future use soil cleanup objectives.

Both Sediment Alternatives 3 and 4 would effectively achieve their respective sediment cleanup objectives. While Sediment Alternative 4 is nearly $2.5 million more costly than Sediment Alternative 3, the implementation of Sediment Alternative 3 will result in the excavation of most of the creek bed to the native clay. As a result, the Sediment Alternative 3 would result in a significant reduction in the concentration of PCBs and other site-related contaminants in the sediment over the site reach, thereby reducing exposure of human and ecological receptors to contaminated sediment and fish.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Subsite.

The selected remedy will permanently address the soil and sediment contamination.

Preference for Treatment as a Principal Element

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances as a principal element (or justify not satisfying the preference). NYSDEC and the EPA do not believe that treatment of the remaining sediments and soil is practicable or cost effective, given the widespread nature of the sediment and soil contamination and the generally low concentrations of contaminants present in the sediment and soils that are being addressed by the selected remedy.

Five-Year Review Requirements

The selected remedy, once fully implemented, will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure. Consequently, a statutory review will be conducted within five years after initiation of remedial action, and at five-year intervals thereafter, to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan identified Sediment Alternative 3 (mechanical excavation to achieve 1.0 mg/kg PCB), and Soil Alternative 2 (soil excavation to achieve restricted SCOs) as the preferred remedy to address the contaminated sediment and soil, respectively. Based upon its review of the written and verbal comments submitted during the public comment period, NYSDEC and the EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

OPERABLE UNIT 2 OF THE GENERAL MOTORS – INLAND FISHER GUIDE
SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

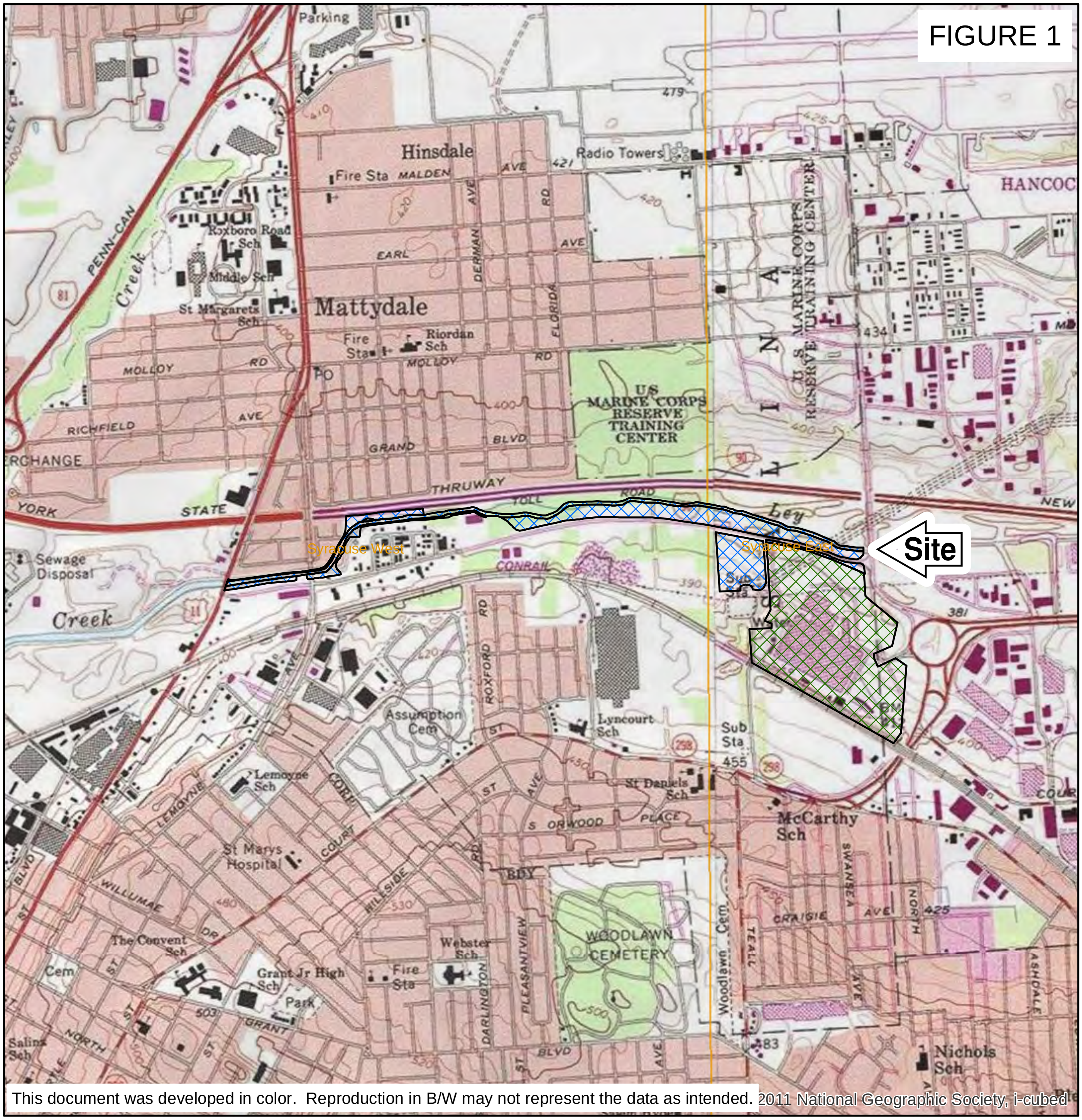
APPENDIX I

FIGURES

I:\Racer-Trust.15388\50292.For-Ifg-Fac-Rifi\Docs\DWG\MXD\Off-Site PDI WP\Proposed Plan\Fig1_Site_Loc.mxd

PLOTDATE: 04/11/14 11:55:40 AM stantosa

FIGURE 1



ADAPTED FROM: SYRACUSE WEST, SYRACUSE EAST NEW YORK USGS QUADRANGLE.

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

SITE LOCATION

LEGEND

- OFF-SITE AREAS
- FORMER IFG FACILITY

QUADRANGLE LOCATION

N

0 1,000 2,000 4,000 6,000 8,000
Feet

1:24,000

APRIL 2014
15388.51418

O'BRIEN & GERE

RACER0059812

FIGURE 2

N

LEGEND

- SOIL BORING
- SURFACE SOIL
- SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER
- FORMER IFG FACILITY PROPERTY BOUNDARY (OU 1)
- FACTORY AVENUE AREA
- LEY CREEK 100-YEAR FLOODPLAIN AREA
- LEY CREEK 100-YEAR FLOODPLAIN HOT SPOT AREA
- LEY CREEK
- NATIONAL GRID WETLANDS
- FACTORY AVENUE / LEMOYNE AVENUE INTERSECTION

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

OU 2 AREAS

0 375 750 1,500
Feet

APRIL 2014
15388.51418

O'BRIEN & GERE

RACER0059813

This document was developed in color. Reproduction in B/W may not represent the data as intended.

I:\Racer-Trust.15388\50292.For-Ifg-Fac-RifiDocs\DWG\MXD\Off-Site PDI WP\Proposed Plan\Fig2_OffSiteAreas_Rev.mxd

PLOTDATE: 04/11/14 12:10:25 PM stantosa

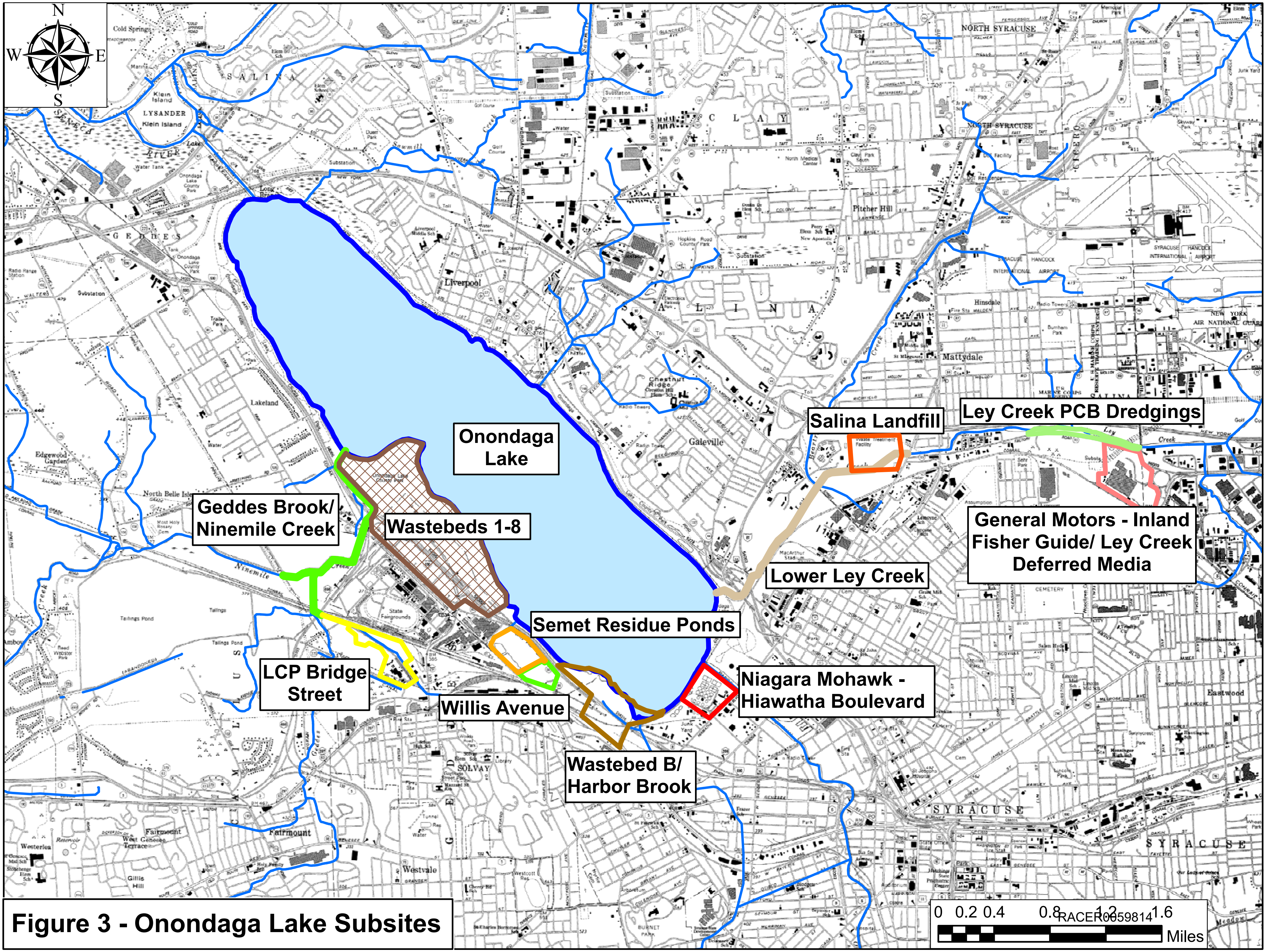
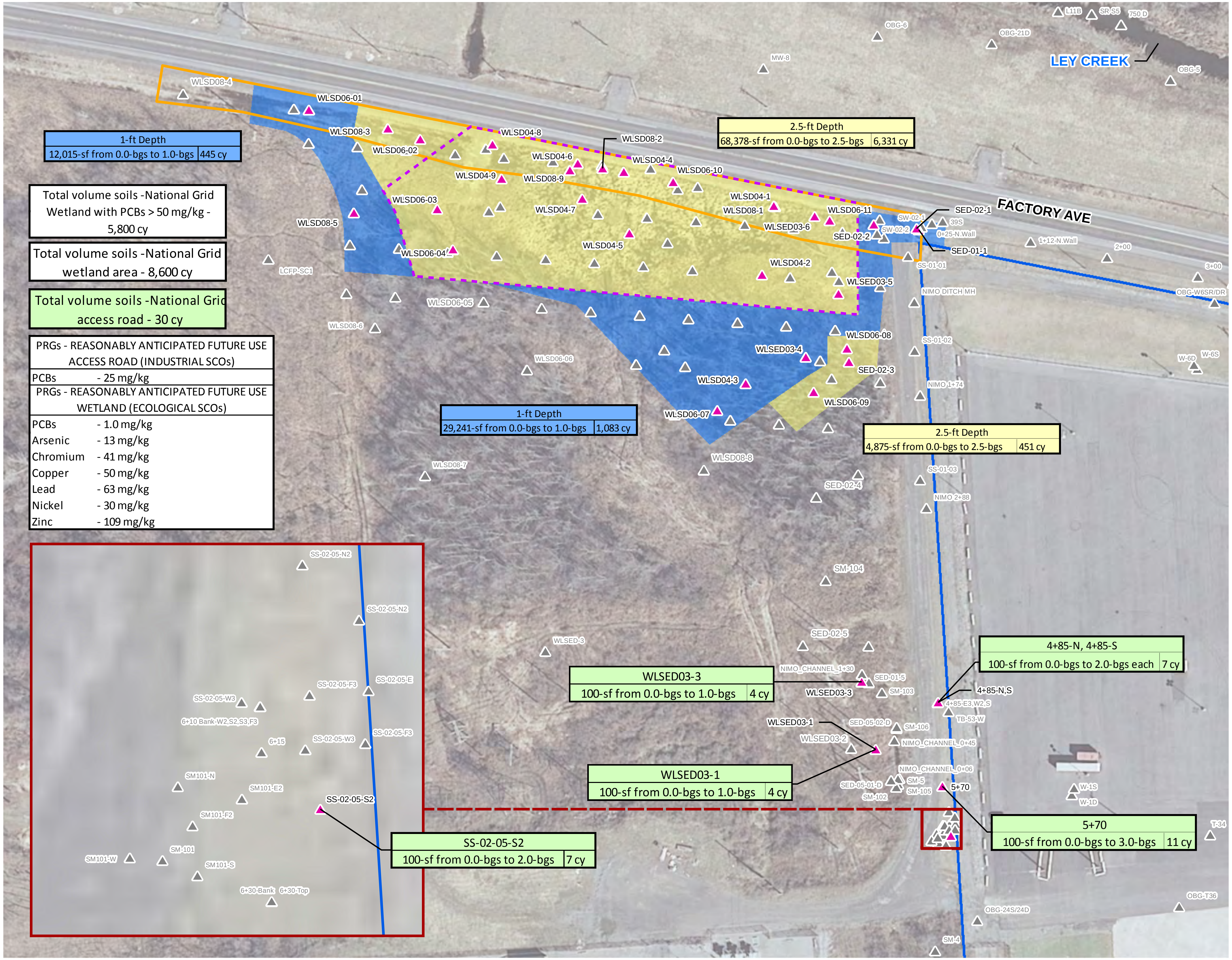


Figure 3 - Onondaga Lake Subsites

RACER0059814

FIGURE 4



This document was developed in color. Reproduction in B/W may not represent the data as intended.

I:\Racer-Trust.15388\50292.For-Ifg-Fac-Rif\Docs\DWG\MXD\Off-Site PDI WP\Proposed Plan\Fig3_Prop_Wetland.mxd

PLOTDATE: 04/11/14 12:14:52 PM stantosa

N

LEGEND

- ▲ SOIL SAMPLE > PRGs*
- ▲ SOIL SAMPLE
- PCBs > 50 mg/kg
- FACTORY AVENUE DITCH

PROPOSED EXCAVATION EXTENT

- 1 FOOT DEPTH
- 2.5 FOOT DEPTH

NOTE:

* PRGs used for area limits are listed in figure box inset.
- Proposed excavation extent excludes soil sample location WLSD04-8; Nickel (0.5-1 ft bgs) is marginally above PRG.
- Industrial SCOs - NYCRR part 375 Soil Cleanup Objectives (SCOs) for Industrial Land Use
- Ecological SCOs - NYCRR Part 375 SCOs for Protection of Ecological Resources

EXCAVATION LIMITS

WLSED03-3	
100-sf from 0.0-bgs to 1.0-bgs	4 cy

AREA AND DEPTH — VOLUME

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

NATIONAL GRID WETLAND AREA

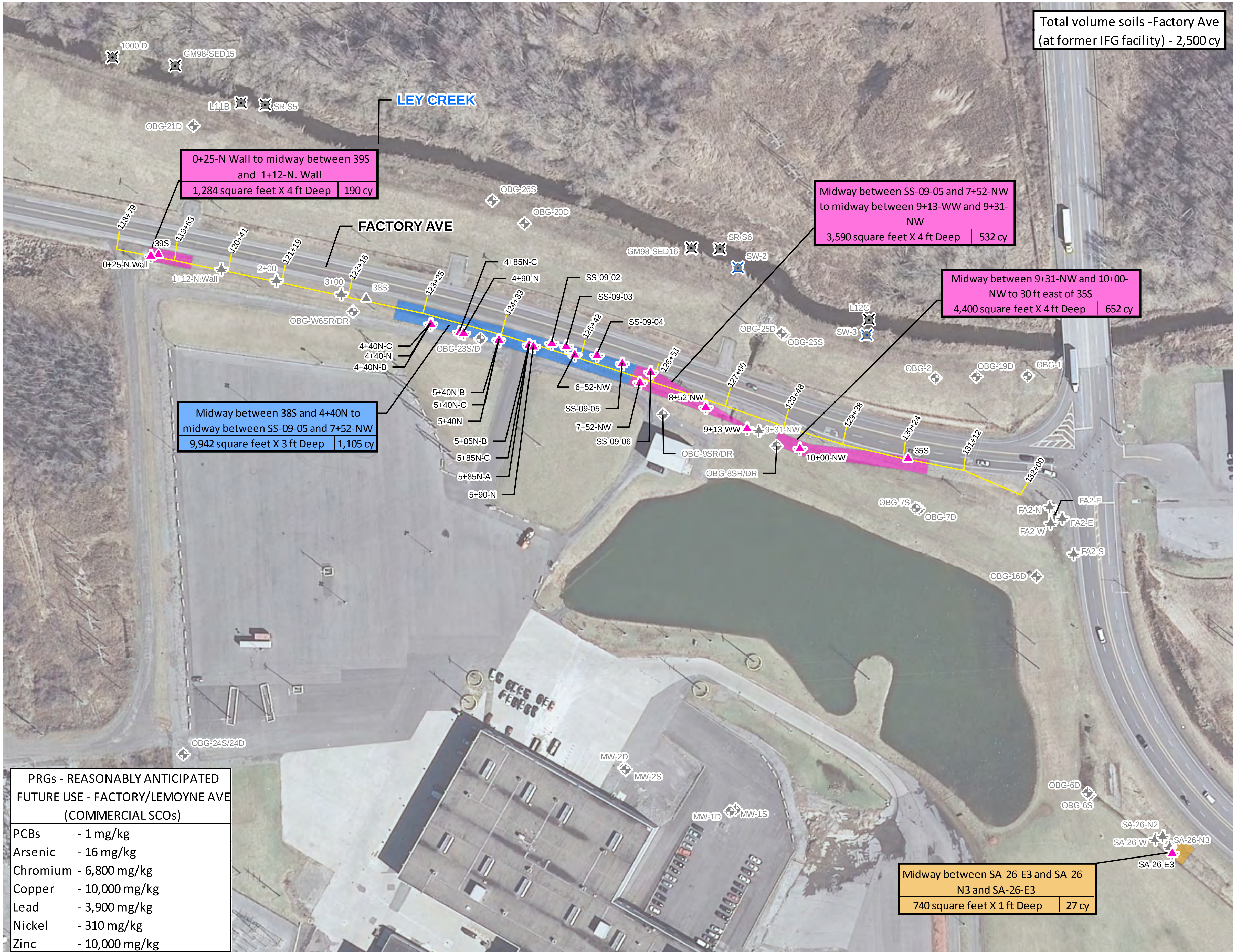
0 50 100 200
Feet

APRIL 2014
15388.51418

O'BRIEN & GERE

RACER0059815

FIGURE 5



PRGs - REASONABLY ANTICIPATED FUTURE USE - FACTORY/LEMOYNE AVE (COMMERCIAL SCOs)	
PCBs	- 1 mg/kg
Arsenic	- 16 mg/kg
Chromium	- 6,800 mg/kg
Copper	- 10,000 mg/kg
Lead	- 3,900 mg/kg
Nickel	- 310 mg/kg
Zinc	- 10,000 mg/kg

This document was developed in color. Reproduction in B/W may not represent the data as intended.

N

LEGEND

- SOIL SAMPLE > PRGs*
- MONITORING WELL
- SOIL BORING
- SURFACE SOIL
- SEDIMENT SAMPLE
- SURFACE WATER SAMPLE
- FORMER IFG FACILITY PROPERTY BOUNDARY

PROPOSED EXCAVATION EXTENT

- 1 FOOT DEPTH
- 3 FOOT DEPTH
- 4 FOOT DEPTH

NOTES:
* PRGs used for area limits are listed in figure box inset.
- Commercial SCOs - 6 NYCRR Part 375 Soil Cleanup Objectives (SCOs) for Commercial Land Use

EXCAVATION EXTENT

Midway between SA-26-E3 and SA-26-N3 and SA-26-E3
740 square feet X 1 ft Deep | 27 cy

AREA AND DEPTH — VOLUME

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

FACTORY AVENUE AREA (AT FORMER IFG FACILITY)

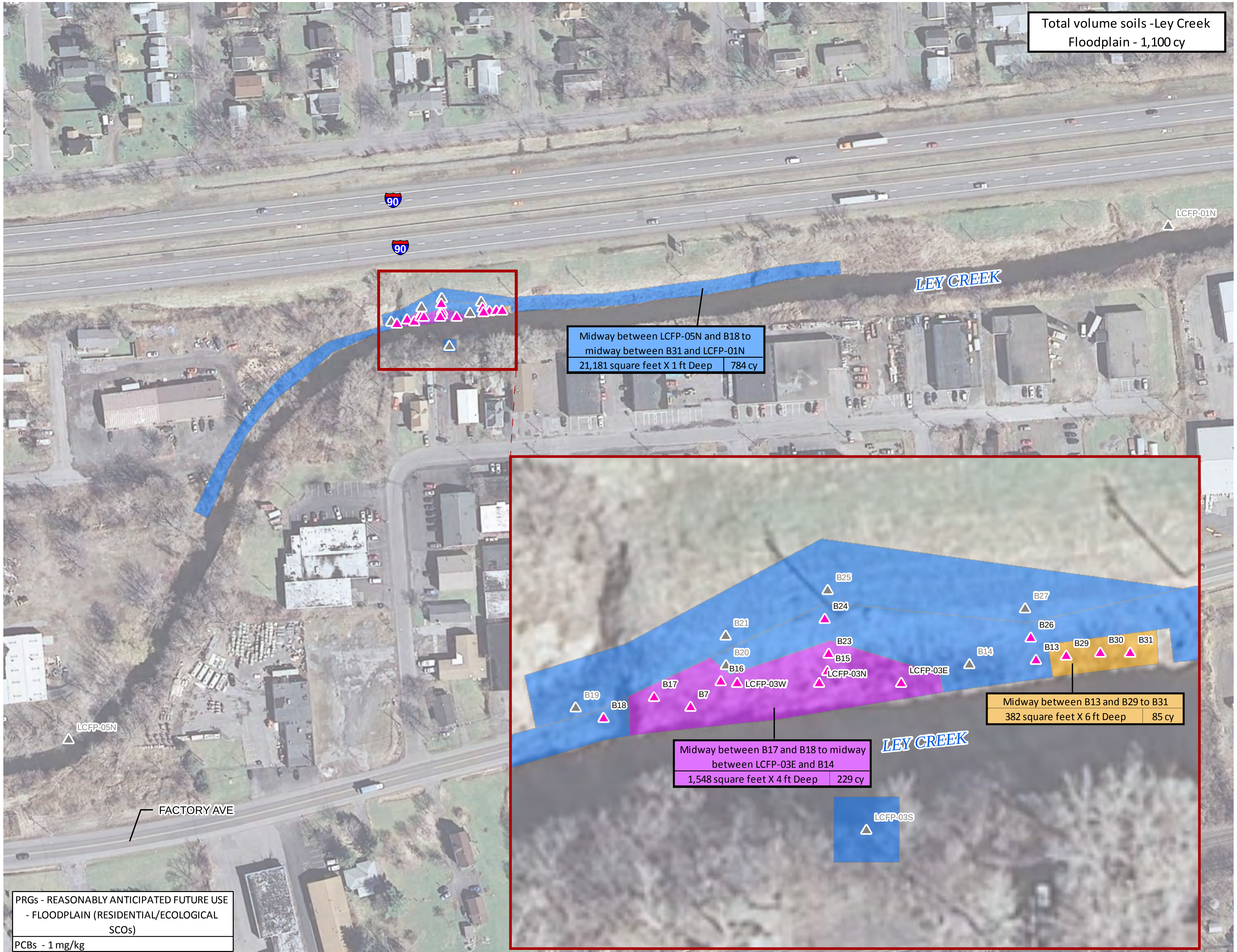
0 70 140 280
Feet

APRIL 2014
15388.51418

O'BRIEN & GERE

RACER0059816

FIGURE 6



This document was developed in color. Reproduction in B/W may not represent the data as intended.

N

LEGEND

▲ SOIL SAMPLE > PRG*

▲ SOIL SAMPLE < PRG*

PROPOSED EXCAVATION EXTENT

1 FOOT DEPTH

4 FOOT DEPTH

6 FOOT DEPTH

NOTES:

* PRGs used for area limits are listed in figure box inset.
- Boring locations acquired from a Trimble Pro XRS GPS Unit
- Residential SCOs - 6 NYCRR Part 375 Soil Cleanup Objectives (SCOs) for Residential Land Use
- Ecological SCOs - 6 NYCRR SCOs for Protection of Ecological Resources

EXCAVATION LIMITS

Midway between B17 and B18 to midway between LCFP-03E and B14	
1,548 square feet X 4 ft Deep	229 cy

AREA AND DEPTH

VOLUME

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

FLOODPLAIN HOT SPOT AND FLOODPLAIN

0 75 150 300
Feet

APRIL 2014
15388.51418

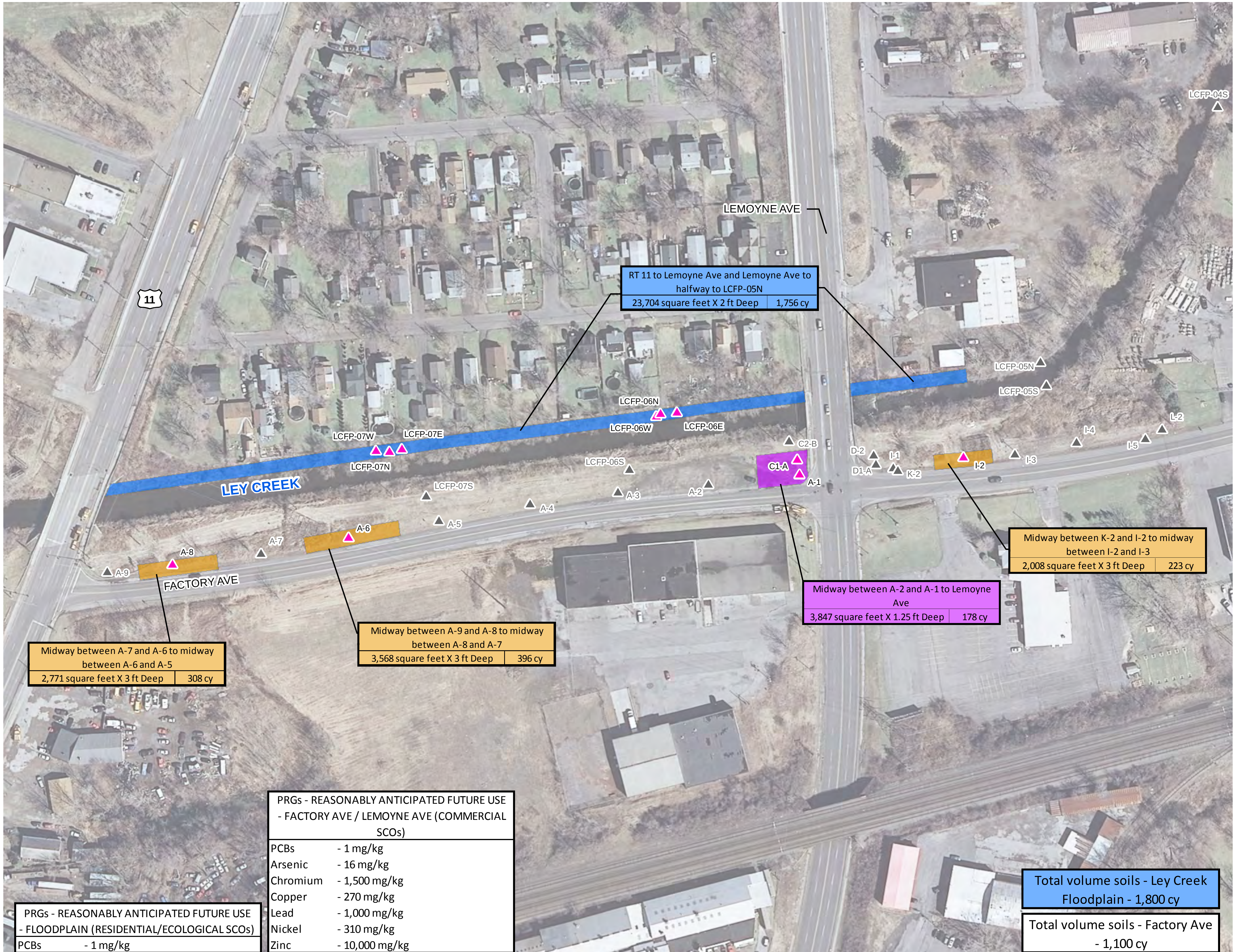
O'BRIEN & GERE

RACER0059817

I:\Racer-Trust.15388\50292.For-Ifg-Fac-Rifi\Docs\DWG\MXD\Off-Site PDI WP\Proposed Plan\Fig6_Flood.mxd

PLOTDATE: 04/17/14 10:40:05 AM stantosa

FIGURE 7



This document was developed in color. Reproduction in B/W may not represent the data as intended.

I:\Racer-Trust.15388\50292.For-Ifg-Fac-Rif\Docs\DWG\MXD\Off-Site PDI WP\Proposed Plan\Fig5_Prop_Factory.mxd

PLOTDATE: 04/24/13 9:47:45 AM stantosa

N

LEGEND

▲ SOIL SAMPLE > PRGs*

▲ SOIL SAMPLE

PROPOSED EXCAVATION EXTENT

- 1.25 FOOT DEPTH
- 2 FOOT DEPTH
- 3 FOOT DEPTH

NOTES:

* PRGs used for area limits are listed in figure box inset.
- Residential SCOs - 6 NYCRR Part 375 Soil Cleanup Objectives (SCOs) for Residential Land Use
- Ecological SCOs - 6 NYCRR SCOs for Protection of Ecological Resources
- Commercial SCOs - 6 NYCRR Part 375 SCOs for Commercial Land Use

EXCAVATION LIMITS

RT 11 to Lemoyne Ave and Lemoyne Ave to halfway to LCFP-05N

23,704 square feet X 2 ft Deep | 1,756 cy

AREA AND DEPTH

VOLUME

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

FACTORY AVE AREA (AT LEMOYNE AVE INTERSECTION)

0 75 150 300

Feet

APRIL 2014
15388.51418

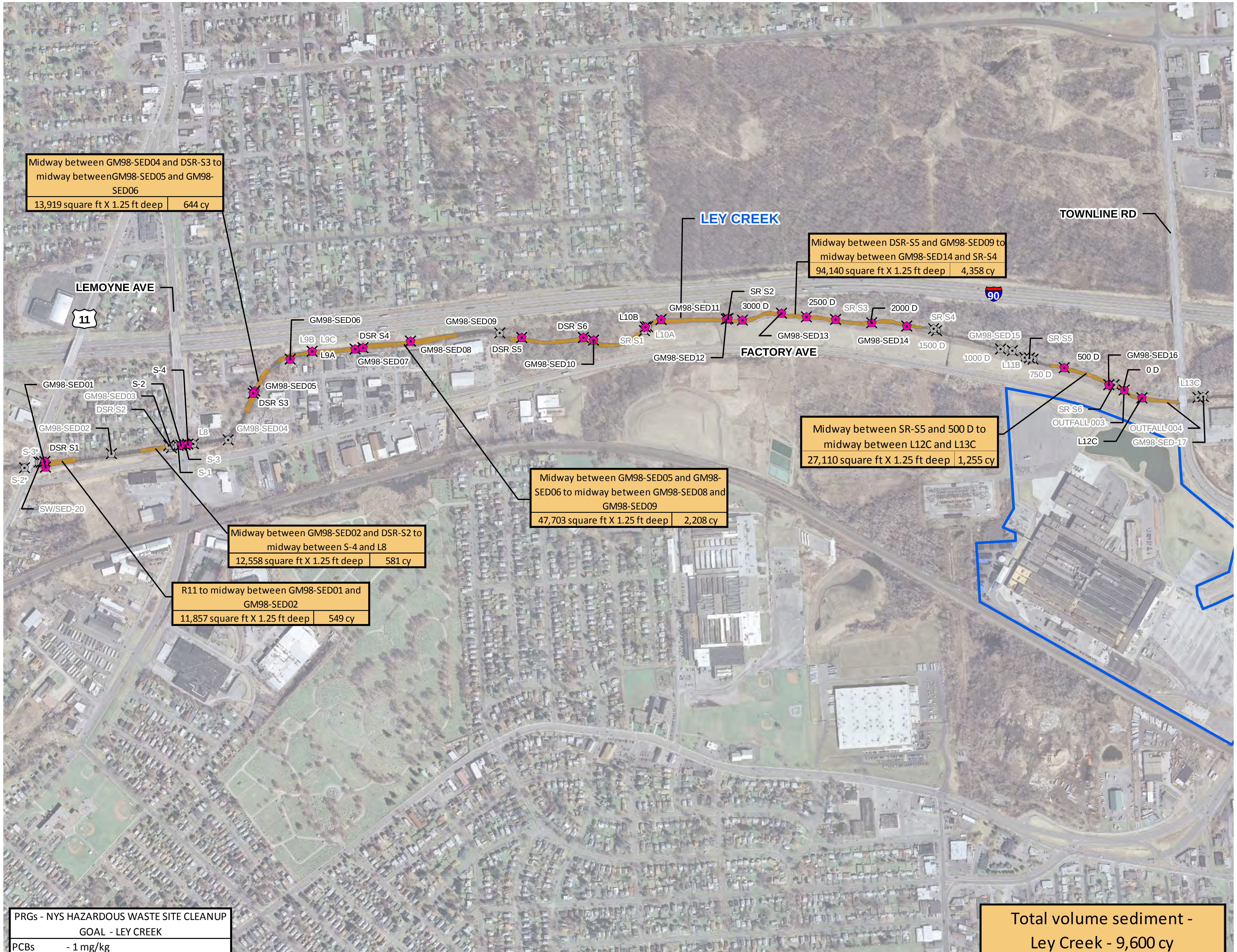
O'BRIEN & GERE

RACER0059818

I:\Racer-Trust.15388\50292.For-Ifg-Fac-Rifi\Docs\DWG\MXD\Off-Site PDI WP\Proposed Plan\Fig6_Prop_Ley.mxd

FIGURE 8

N



LEGEND

- SEDIMENT SAMPLE > PRG*
- SED
- FORMER IFG FACILITY PROPERTY BOUNDARY
- PROPOSED EXCAVATION EXTENT

NOTES:
- Ley Creek length between Townline Rd and Route 11: 9,242 linear ft.
- Proposed excavation extent square footage was estimated using the aerial image of each relevant reach of Ley Creek.
* PRGs used in area limits are listed in figure box inset.
- PRG of 1 mg/kg for total PCBs based on previously selected cleanup goals for NYS Hazardous Waste Sites.

EXCAVATION LIMITS

R11 to midway between GM98-SED01 and GM98-SED02	
11,857 square ft X 1.25 ft deep	549 cy

AREA AND DEPTH — VOLUME

GENERAL MOTORS
IFG SITE
OPERABLE UNIT 2
SYRACUSE, NEW YORK

LEY CREEK SEDIMENT

0 375 750 1,500
Feet

APRIL 2014
15388.51418

O'BRIEN & GERE

RACER0059819

PLOTDATE: 04/11/14 12:19:02 PM stantosa

This document was developed in color. Reproduction in B/W may not represent the data as intended.